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**THE GENUS *EUSTALA* (ARANEAE, ARGIOPIDAE) IN  
CENTRAL AMERICA**

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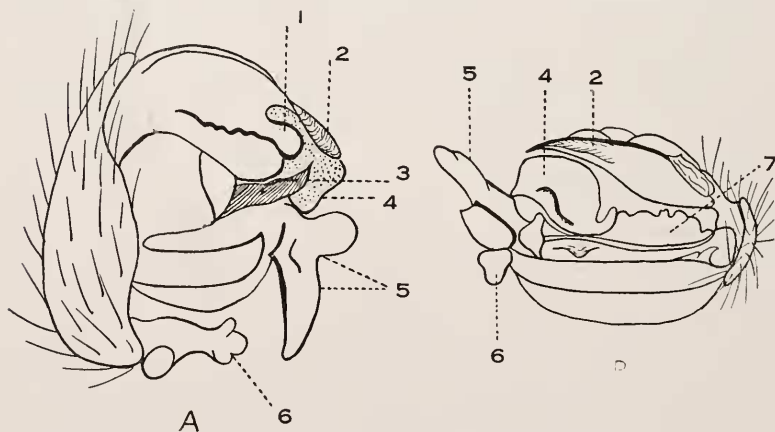
No. 6—*The Genus Eustala (Araneae, Argiopidae) in Central America*

BY ARTHUR M. CHICKERING

In connection with previous publications (1943, 1948, 1950) I have pointed out some interesting instances of the process of speciation among certain genera of spiders in Panama. The present study of the genus *Eustala* has been somewhat broadened to include the known species of the whole of Central America although the genus remains best known in Panama where the most careful collecting has been done. In several respects this study has proven to be the most difficult of any thus far undertaken on Central American genera. Differences between species are often obscure and very puzzling. Color patterns have been shown to be of little value as a means of distinguishing species. The male palps and the epigyna are the most reliable specific structures upon which one can rely in separating species. Doubtless there will be araneologists who will differ with me in respect to the degree of reliability shown by these structures. The difficulties I have mentioned have in the past caused much confusion and many errors in identification. It seems evident from a study of specimens of nearly all of the species recognized by the Cambridges (1889-1905) that even they dealt, to some extent, with mixed material. Among females I have found that close attention must be paid to such details of the epigynum as: shape of base, shape of scape, shape of the clear central area of the base bordered by tubules, relative proportions of base and scape, positions of the apertures to the spermathecae, positions of the spermathecae, etc. F. P. Cambridge (1904) recognized and definitely named several parts of the male palpal tarsus considered important in distinguishing species. I have thought it best to retain the Cambridge terminology for these parts with little modification and few additions. These palpal parts may be named as follows: basal apophysis (basal tarsal hook), uncus, embolus, conductor, clavis, vesicle, terminal laminae, maxillary tooth, femoral tubercle. The named parts of the male palpal tarsus are shown in Figures A and B, based upon *E. fuscovittata* (Keyserling).

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The types of *Eustala abdita* sp. nov., *E. banksi* sp. nov., *E. mexicana* sp. nov., *E. mimica* sp. nov., *E. panamana* sp. nov. will be deposited in the American Museum of Natural History, New



External Anatomy of *Eustala*  
Figures A and B

Fig. A. Diagram of male palpal tarsus; lateral view; showing important features.

Fig. B. The same; view from in front.

1—vesicle; 2—embolus; 3—uncus; 4—conductor; 5—clavis; 6—tarsal hook (basal apophysis); 7—terminal laminae.  
(Both diagrams based upon *E. fusco-vittata*)

York City. All other types will be deposited in the Museum of Comparative Zoology at Harvard College.

### Genus EUSTALA Simon 1895

The Cambridges (1889-1904) reported the following eleven species of *Eustala* from Central America: *E. anastera* (Walckenaer); *E. bifida* F. P. Cambridge; *E. clavispinia* (O. P. Cambridge); *E. fragilis* (O. P. Cambridge); *E. fusco-vittata* (Keyserling); *E. guttata* F. P. Cambridge; *E. illicita* (O. P. Cambridge); *E. latebricola* (O. P. Cambridge); *E. scutigera* (O. P. Cambridge); *E. semifoliata* (O. P. Cambridge); *E. vegeta* (Keyserling). *E. conformans* Chamberlin completes the list of twelve species known from Central America prior to the present work on this genus. According to my present view of speciation in this genus we must now add the following twenty-six new species to the known list from this part of the world: *E. abdita* sp. nov.; *E. banksi* sp. nov.; *E. bucolica* sp. nov.; *E. delecta* sp. nov.; *E. exigua* sp. nov.; *E. gertschi* sp. nov.; *E. inconstans* sp. nov.; *E. ingenua* sp. nov.; *E. innoxia* sp. nov.; *E. lata* sp. nov.; *E. longembola* sp. nov.; *E. maxima* sp. nov.; *E. mexicana* sp. nov.; *E. mimica* sp. nov.; *E. minima* sp. nov.; *E. montana* sp. nov.; *E. montivaga* sp. nov.; *E. oblonga* sp. nov.; *E. panamana* sp. nov.; *E. redundans* sp. nov.; *E. rustica* sp. nov.; *E. scitula* sp. nov.; *E. sedula* sp. nov.; *E. tantula* sp. nov.; *E. tumida* sp. nov.; *E. venusta* sp. nov. Thirty-two of the thirty-eight species now known in Central America are found in Panama. Those which thus far appear not to occur in Panama are the following: *E. abdita* sp. nov.; *E. anastera* (Walck.); *E. banksi* sp. nov.; *E. bifida* F. P. Cambridge; *E. clavispinia* (O. P. Cambridge); and *E. mexicana* sp. nov. The total number listed here will probably be somewhat reduced when it becomes possible to match up males and females more successfully than I have been able to do. There are few reliable guides in this genus, particularly among those with the round-triangular form, which can be used to match males and females. Among the species from Central America, I have found the color pattern so highly variable within the species and between males and females that I am compelled to avoid its use in any important way. My experience

is, therefore, very different from that of Mello-Leitao (1947). Where there is reasonable doubt I have chosen to describe the males and females as separate species rather than run the danger of missmating, with the resulting complications in later literature.

### *Key to the Species of EUSTALA in Central America*

#### Males

1. Abdomen elongate, slender (*fusco-vittata*, *illicita*, *oblonga*) .....2
1. Abdomen not elongate; rounded-triangular .....4
2. Clavis with a distinct robust lateral process at base; conductor simple, without distinct processes (Fig. 3) .....*E. fusco-vittata*, p. 398
2. Clavis without distinct lateral process; conductor with two or three distinct processes .....3
3. Clavis deeply excavated at base; conductor with three slender processes (seen in lateral view, Fig. 15) .....*E. oblonga*, p. 404
3. Clavis without basal excavation; conductor with two robust processes (seen in lateral view, Fig. 8) .....*E. illicita*, p. 401
4. Uncus with a broad basal enlargement more or less concealing the tip (*bifida*, *mimica*, Figs. 37 and 92) .....5
4. Uncus with only a shoulder at base or without any basal enlargement .....6
5. Conductor robust; uncus without a distinct shank .....*E. bifida*, p. 421
5. Conductor smaller; uncus with a distinct shank proximal to basal enlargement .....*E. mimica*, p. 467
6. Uncus long slender, with no basal shoulder or enlargement (*exigua*, *gertschi*, *tantula*) .....7
6. Uncus robust, with or without a basal shoulder .....9
7. Uncus somewhat concealed; vesicle extremely large, spirally twisted .....*E. tantula*, p. 505
7. Uncus not concealed; vesicle of more normal relative size, not spirally twisted .....8
8. Conductor with two slender extensions, seen in lateral view (Fig. 57) ..  
.....*E. exigua*, p. 435
8. Conductor without slender projections (Fig. 61) ...*E. gertschi*, p. 440
9. Conductor with a definite lobe (*delecta*, *scutigera*) .....10
9. Conductor without any definite lobe .....11
10. Conductor with a conspicuous lobe somewhat overlapping the uncus; embolus relatively long and slender .....*E. scutigera*, p. 496
10. Conductor with an inconspicuous lobe not overlapping the uncus; embolus relatively broad and flat .....*E. delecta*, p. 431

11. With an extremely long slender embolus (Fig. 83) *E. longembola*, p. 458
11. Without an extremely long slender embolus .....12
12. Uncus distinctly sickle-shape, with a marked shoulder at its base .....  
.....*E. montana*, p. 474
12. Uncus not distinctly sickle-shape, with no shoulder at its base or with  
a moderately developed shoulder .....13
13. Uncus short, small and somewhat concealed; vesicle concealed .....  
.....*E. abdita*, p. 410
13. Uncus a more or less robust hook; vesicle usually exposed (concealed  
in *inconstans*) .....14
14. Massive conductor continued posteriorly as a slender, setose extension ..  
.....*E. anastera*, p. 414
14. Conductor of moderate size and not continued posteriorly as a slender,  
setose extension .....15
15. Embolus relatively long and slender; vesicle relatively large and bulbous  
(*guttata*, *scitula*) .....16
15. Embolus not so long and not so slender; vesicle of moderate size or  
concealed .....17
16. Uncus of moderate size, with a definite shoulder at its base .....  
.....*E. guttata*, p. 442
16. Uncus more robust, without a definite shoulder at its base .....  
.....*E. scitula*, p. 492
17. Embolus very short, very broad at base; vesicle withdrawn or greatly  
reduced in size .....*E. inconstans*, p. 446
17. Embolus moderately long and slender; vesicle of moderate size and  
clearly exposed .....18
18. Fourth femur with ventral spines confined to distal third of segment  
(*bucolica*, *rustica*) .....19
18. Fourth femur with ventral spines extending throughout much more than  
distal third of segment (*banksi*, *vegeta*) .....20
19. Embolus with free part relatively short and slender ..*E. bucolica*, p. 425
19. Embolus terminally broad and grooved .....*E. rustica*, p. 486
20. Uncus with a long robust base or shank; conductor deeply grooved on  
distal surface .....*E. banksi*, p. 417
20. Uncus without a long robust basal shank; conductor without a deep  
groove on distal surface .....*E. vegeta*, p. 511

### Females

(*E. fragilis* (O. P. Cambridge) is not included in the key because of the lack of clear and definite knowledge about the species.)

1. Abdomen elongate, slender (*fusco-vittata*, *illicita*, *oblonga*) .....2
1. Abdomen not elongate; rounded-triangular .....4

2. Scape of epigynum not clearly separated from base; gradually narrowed from base to tip .....*E. fusco-vittata*, p. 398
2. Scape of epigynum clearly separated from base; not gradually narrowed from base to tip .....3
3. Scape arises from near middle of base and extends as a slender median structure .....*E. oblonga*, p. 404
3. Scape arising from near anterior margin of base and widened in middle .....*E. illicita*, p. 401
4. Pars cephalica extended into a distinct eye-bearing cone (Fig. 131) ...  
.....*E. tumida*, p. 508
4. Pars cephalica normal, not extended into an eye-bearing cone .....5
5. Base of epigynum expanded into a pair of shoulders surrounding the apertures; scape relatively very slender (*guttata*, *redundans*) .....6
5. Base of epigynum not expanded into a pair of shoulders surrounding the apertures .....7
6. Base of epigynum with a posterior projection from the central area ..  
.....*E. redundans*, p. 484
6. Base of epigynum without any posterior projection from the central area .....*E. guttata*, p. 442
7. Scape of epigynum sharply narrowed where it joins the base, viewed from below (*ingenua*, *latebricola*, *mexicana*, *minima*, *vegeta*, *venusta*) .....8
7. Scape of epigynum gradually narrowed from base to tip, viewed from below (*anastera*, *maxima*, *innoxia*, *montivaga*, *panamana*, *rustica*, *scutigera*, *sedula*, *semifoliata*) .....13
8. Scape of epigynum short, expanded at tip, originates from base behind the anterior margin .....*E. minima*, p. 471
8. Scape longer, not expanded at tip or, if expanded at tip, originates at anterior border of base .....9
9. Apertures nearly in contact in middle; scape of epigynum only slightly rugulose .....*E. ingenua*, p. 449
9. Apertures of epigynum much farther apart; scape at least moderately rugulose .....10
10. Scape of epigynum with a semicircular ridge just anterior to apertures; the latter barely two diameters of one of them apart .....  
.....*E. latebricola*, p. 457
10. Scape of epigynum without a semicircular ridge in front of the apertures; the latter more than two diameters of one of them apart ...11
11. Central area of base of epigynum drawn out laterally into narrow extensions; base in general quite oval in outline ..*E. mexicana*, p. 465
11. Central area of base of epigynum not drawn out laterally into narrow extensions; base in general not oval in outline .....12
12. Apertures of epigynum fully five times the diameter of one of them



- apart; spermathecae several diameters of one of them apart .....  
 ..... *E. vegeta*, p. 511
12. Apertures of epigynum not so far apart; spermathecae in contact in  
 middle of central area ..... *E. venusta*, p. 515
13. Venter with a pair of white spots transversely placed .....  
 ..... *E. semifoliata*, p. 502
13. Venter without a definite pair of white spots transversely placed ....14
14. Abdominal hairs abruptly dilate basally ..... *E. clavispina*, p. 428
14. Abdominal hairs not dilate basally .....15
15. Apertures of epigynum hidden; epigynum in general simple, with few  
 external features ..... *E. innoxia*, p. 452
15. Apertures of epigynum clearly exposed but sometimes small; epigynum  
 more complicated, with several external features .....16
16. Central part of base of epigynum relatively small; only about one  
 fourth as broad as base; base nearly as broad as long; chitinized  
 areas lateral to base ..... *E. conformans*, p. 430
16. Central part of base of epigynum relatively larger and considerably  
 broader; without conspicuous chitinized areas lateral to base ....17
17. Scape of epigynum nearly or quite as long as base is broad .....18
17. Scape of epigynum not nearly as long as base is broad .....19
18. Apertures of epigynum nearly in contact; central area of base triangu-  
 lar in outline ..... *E. sedula*, p. 500
18. Apertures of epigynum well separated; central area of base more oval  
 in outline ..... *E. lata*, p. 454
19. Apertures of epigynum nearly or quite at lateral margins of base  
 (*bifida*, *maxima*) .....20
19. Apertures of epigynum far removed from margins of base .....21
20. The inner of the paired tubules bounding the central area of base  
 shorter and broader; central area of base raised into two marked  
 prominences ..... *E. bifida*, p. 421
20. The inner of the two tubules bounding the central area of base narrower  
 and much longer; the central area of base not raised into prominences  
 ..... *E. maxima*, p. 461
21. Central area of base of epigynum bounded by only one definite pair of  
 curved tubules; scape much narrower at its base than width of the  
 latter ..... *E. rustica*, p. 486
21. Central area of base of epigynum bounded by two pairs of more or less  
 distinct tubules; scape nearly as wide at its base as the width of  
 the whole base .....22
22. The central area of the base of the epigynum considerably longer than  
 broad ..... *E. anastera*, p. 414
22. The central area of the base of the epigynum as wide as long or wider  
 than long .....23

23. Scape of the epigynum not much narrowed until a considerable distance in front of the apertures ..... *E. scutigera*, p. 496
23. Scape of the epigynum gradually narrowed from opposite the apertures (*montivaga*, *panamana*) ..... 24
24. Central area of base of the epigynum definitely wider than long ..... *E. panamana*, p. 480
24. Central area of base of the epigynum about as wide as long ..... *E. montivaga*, p. 478

### EUSTALA FUSCO-VITTATA (Keyserling), 1863

(Figures 1-5)

*Epeira fusco-vittata* Keyserling, 1863

*E. fusco-vittata* Keyserling, 1892

*Cyclosa thorelli* McCook, 1893

*Eustala fusco-vittata* Simon, 1897

*E. caudata* Banks, 1898

*E. fusco-vittata* F. P. Cambridge, 1904

*E. fusco-vittata* Petrunkevitch, 1911

*E. fusco-vittata* Petrunkevitch, 1925

*E. fusco-vittata* Banks, 1929

*E. fusco-vittata* Petrunkevitch, 1930

*E. fusco-vittata* Bryant, 1940

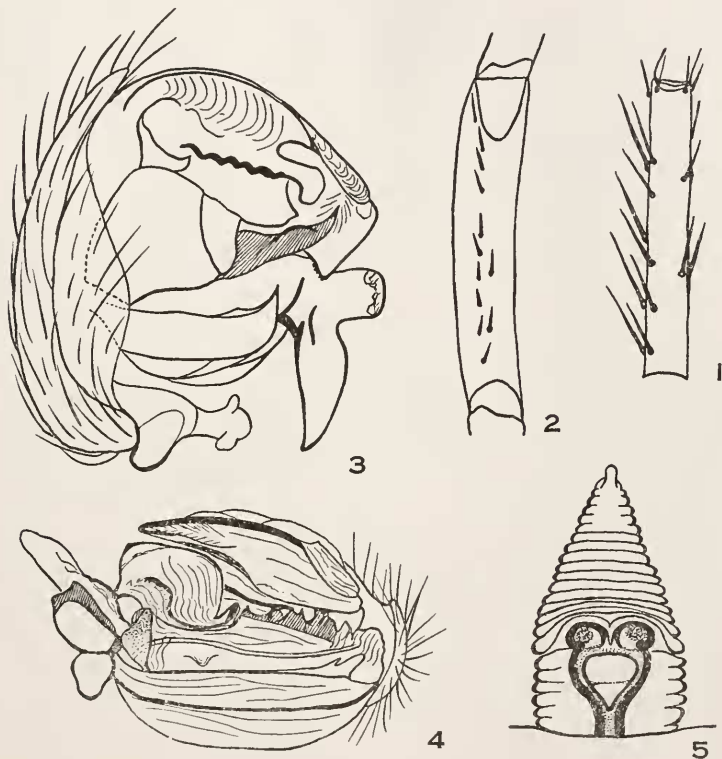
This is the best-known species in the genus, in Central America. It has been collected over a wide area throughout Central America, several of the West Indies, and much of South America. In this species, as in others previously known, figures and the most important facts concerning basic structural features are given herewith as an aid to identification and study of the group.

*Male hypotype.* Total length 8.58 mm. Central ocular quadrangle wider in front than behind in ratio of 4 : 3; almost exactly as wide in front as long. Ratio of eyes AME : ALE : PME : PLE = 13 : 9 : 11 : 8.5. AME separated from one another by about four-thirds of their diameter, from ALE by nearly five-halves of their diameter. PME separated from one another by a little more than two-thirds of their diameter, from PLE by nearly four times their diameter. Laterals separated from one another by the radius of ALE. Promargin of fang groove with four teeth, the second and fourth smaller, the others robust; retromargin with three teeth. Secondary sexual char-



acters on maxillae and adjacent segments appear as usual and are well developed. Sternum longer than wide in ratio of 23 : 13.

*Legs.* 1423. Width of first patella at "knee" .433 mm., tibial index of first leg 9. Width of fourth patella at "knee" .390 mm., tibial index of fourth leg 9.



External Anatomy of *Eustala*  
Figures 1-5, *E. fusco-vittata*

- Fig. 1. Left second tibia; ventral view.
- Fig. 2. Right second femur; ventral view.
- Fig. 3. Left male palpal tarsus; lateral view.
- Fig. 4. Left male palpal tarsus; from in front.
- Fig. 5. Epigynum; from below.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.030	1.560	3.510	3.900	1.267	14.267
2.	3.250	1.235	1.950	2.860	1.235	10.530
3.	2.405	.845	1.430	1.625	.845	7.150
4.	4.030	1.430	2.990	3.250	1.170	12.870
Palp.	.715	.352	.220	—	1.235	2.522

Second tibia with ventral and related spines as shown in Figure 1. The ventral femoral spines on the second leg are particularly prominent; in the hypotype there are twelve on the right (Fig. 2) and seven on the left. The fourth femur appears regularly to be devoid of ventral spines.

*Palp.* Complicated and characteristic; features of femur, patella and tibia are about as usual in the genus. Tarsus: the basal tarsal apophysis has a distorted arrow-shape; the clavis is deeply excavated at its base and has a robust anterolateral process, and is also seen to be geniculate when viewed laterally; the uncus is long, rather slender, and has a central medial curved ridge; the conductor is relatively simple and when viewed ventrolaterally it appears more or less quadrilateral but is deeply grooved distally; the vesicle is small, strongly chitinized; the embolus is thin, grooved, and gently curved at its distal end; the terminal laminae include a series of strongly chitinized dentations (Figs. 3-4).

*Color in alcohol.* The carapace has a rather narrow central brownish stripe and is yellowish elsewhere. The sternum is yellowish flecked with grayish. Abdomen: there is a fairly well marked dorsal folium divided into three stripes of which the laterals are lighter and contain reddish dots; the venter has a broad central brownish stripe on each side of which there is a yellowish granular stripe. Much variation in color pattern has been noted among the many individuals studied.

*Female hypotype.* Total length 8.255 mm.

*Legs.* 1423. Width of first patella at "knee" .433 mm., tibial index of first leg 9. Width of fourth patella at "knee" .401 mm., tibial index of fourth leg 10.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.380	1.625	3.055	3.445	1.170	12.675
2.	2.795	1.495	2.925	3.120	1.105	11.440
3.	2.015	.780	1.235	1.430	.780	6.240
4.	3.500	1.365	2.730	3.120	.975	11.690

*Epigynum*. The apertures are nearly in contact in the middle; the posterior surface has a characteristic central convexity; the scape, broad at the base, gradually tapers to the tip (Fig. 5).

*Type locality*. Male hypotype from Barro Colorado Island, C. Z., August, 1950; female hypotype from the same locality, July, 1939. Several hundred specimens of both sexes have been examined from many localities in Mexico, Guatemala, Honduras, Costa Rica, Nicaragua, and Panama.

EUSTALA ILLICITA (O. P. Cambridge), 1889

(Figures 6-11)

*Epeira illicita* O. P. Cambridge, 1889

*E. cambridgei* Keyserling, 1893

*Eustala illicita* F. P. Cambridge, 1904

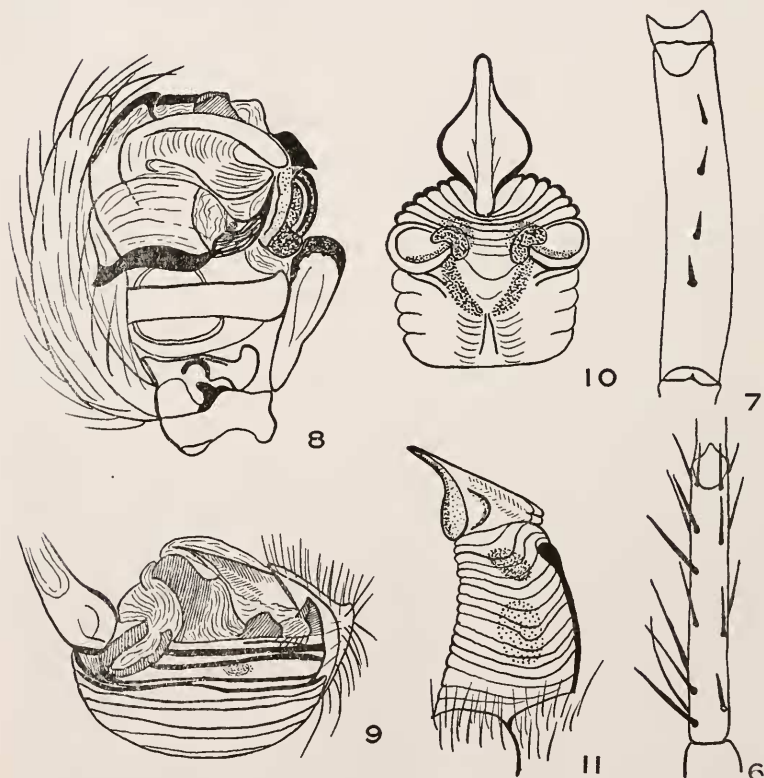
*E. illicita* Petrunkevitch, 1911

I have had only females from the British Museum for comparison but there can hardly be any doubt of the correct identification of the males, however.

*Male hypotype*. Total length 6.50 mm. With an elongated form like that of *E. fusco-vittata* but more slender than in that species. Central ocular quadrangle wider in front than behind in ratio of 6 : 5; slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 11 : 8 : 10.5 : 7.5. AME separated from one another by nearly five-thirds of their diameter, from ALE by nearly five-halves of their diameter. PME separated from one another by nearly their diameter, from PLE by about seven-halves of their diameter. Laterals separated from one another by the radius of ALE. Three long slender spines form a triangular area between AME. Height of clypeus equal to nearly three-halves of the diameter of AME. Promargin of fang groove with five teeth, the fourth the largest; retromargin with two on the right side and three on the left. The secondary sexual characters appear about as usual on the first coxa and second femur.

*Legs*. 1423. Width of first patella at "knee" .379 mm., tibial index of first leg 8. Width of fourth patella at "knee" .357 mm., tibial index of fourth leg 9.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.835	1.365	3.315	3.347	.975	12.837
2.	3.185	1.170	2.405	2.605	.910	10.275
3.	2.145	.715	1.170	1.237	.715	5.982
4.	3.575	1.235	2.470	3.120	.845	11.245
Palp	.466	.314	.271	—	.980	2.031

External Anatomy of *Eustala*Figures 6-11, *E. illicita*

- Fig. 6. Left second tibia, ventral view.  
 Fig. 7. Left second femur, ventral view.  
 Fig. 8. Left male palpal tarsus, lateral view.  
 Fig. 9. Left male palpal tarsus, from in front.  
 Fig. 10. Epigynum, from below.  
 Fig. 11. Epigynum, lateral view.

Second tibia with ventral and related spines as shown in Figure 6. The first femur has a double series of ventral spines as follows: promargin with one or two near distal end and hardly more than bristles; the retromargin has three all in the distal two fifths of the segment. The second femur has a single series of ventral spines with four on the left side and five on the right (Fig. 7); all are fairly robust. The third femur has a series of two or three ventral spines. The fourth femur appears to be regularly devoid of ventral spines.

*Palp.* Features of the femur, patella, and tibia appear to be typical of the genus. Tarsus: basal tarsal apophysis well developed but unnoteworthy; clavis moderately robust, with its surface somewhat irregular, and with base strongly chitinized but unexcavated; the uncus is a well developed, evenly curved, sickle-shaped hook; the conductor is massive, deeply excavated along its lateral surface and with two processes as seen in lateral view; distally the conductor and terminal laminae combine to make two conspicuous grooves; the vesicle is small but clearly evident; the embolus is relatively short, flattened, and curved (Figs. 8-9).

*Color in alcohol.* Carapace and legs almost unicolorous amber-yellow. Sternum yellowish, flecked with brownish gray. Abdomen: dorsal folium very poorly defined; in a male from Mexico the abdominal markings are very similar to those recorded for *E. fusco-vittata*; the venter has a broad dark stripe from genital groove to base of spinnerets together with a narrow whitish granular margin.

*Female hypotype.* Total length 12.22 mm.; with the elongated form characteristic of *E. fusco-vittata* (Keys.) and *E. oblonga* sp. nov.

*Legs.* Width of first patella at "knee" .542 mm., tibial index of first leg 9. Width of fourth patella at "knee" .520 mm., tibial index of fourth leg 10.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.875	1.950	4.225	4.160	1.170	16.380
2.	4.290	1.820	3.640	3.900	1.170	14.820
3.	2.600	1.105	1.495	1.885	.910	7.995
4.	4.875	1.820	3.445	4.030	1.170	15.340

Ventral femoral spines are rare in the females and, apparently, quite irregular.

*Epigynum.* The base appears to have a more or less distinctive pattern of tubules, apertures, and striations. The scape is very distinctive; it begins narrow, almost immediately broadens, and then narrows again to terminate in a blunt point (Figs. 10-11).

*Color in alcohol.* There is a narrow dark middorsal stripe on the abdomen with the dorsal folium also poorly defined. The venter has a moderately broad dark median stripe and a yellowish area on each side.

*Type locality.* The Cambridges had this species from Mexico and Guatemala. The hypotype male is from Madden Dam Forest, C. Z., July, 1950; the female hypotype is from San Luis Potosi, Mexico, July, 1941 (L. I. Davis). Specimens from Mexico, Guatemala, Costa Rica, El Valle, R. P., November, 1946; Canal Zone, July, 1950 (but not yet from Barro Colorado Island) have been studied.

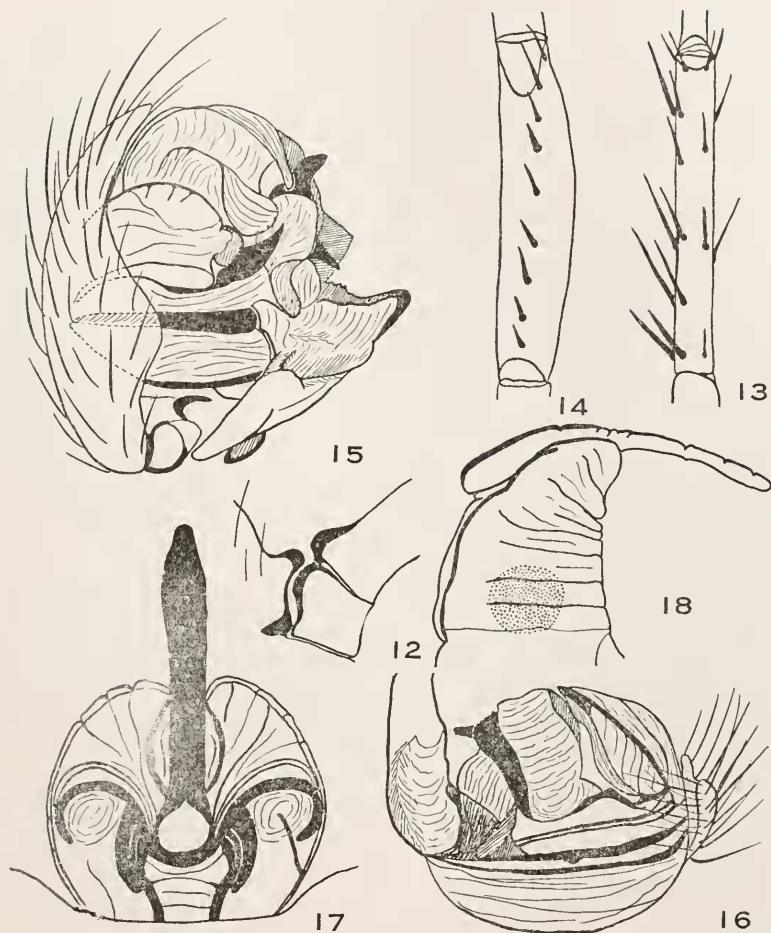
EUSTALA OBLONGA sp. nov.

(Figures 12-18)

*Male holotype.* Total length 6.825 mm. Carapace 3.25 mm. long, 2.47 mm. wide opposite interval between second and third coxae where it is widest; .975 mm. tall and, therefore, nearly .4 as tall as wide; gently raised from PME to opposite third coxae from where descent arches sharply to posterior border; well rounded from opposite posterior border of fourth coxae to opposite anterior border of second coxae from where it is narrowed to a blunt point between AME; longitudinal thoracic groove long and well marked; with a moderately well developed covering of light yellowish hair; with several slender spines in ocular area.

*Eyes.* Eight in two rows, all dark; ocular tubercle bearing ALE quite prominent; viewed from above, both rows strongly recurved; viewed from in front, anterior row moderately procurved; central ocular quadrangle wider in front than behind in ratio of 20 : 17, slightly wider in front than long; ALE extend somewhat beyond margins of carapace at their level. Ratio of eyes AME : ALE : PME : PLE = 14 : 9 : 11 : 10. AME sep-





External Anatomy of *Eustala*  
 Figures 12-18, *E. oblonga* sp. nov.

- Fig. 12. Male maxilla, palpal femur and trochanter  
 Fig. 13. Left second tibia from below.  
 Fig. 14. Left second femur from below.  
 Fig. 15. Left palpal tarsus, lateral view.  
 Fig. 16. Left palpal tarsus from in front.  
 Fig. 17. Epigynum from below.  
 Fig. 18. Epigynum, lateral view.

arated from one another by nine-sevenths of their diameter, from ALE by about 1.6 times their diameter. PME separated from one another by their diameter, from PLE by about three times their diameter. Laterals separated by three-tenths of the diameter of PLE. Height of clypeus equal to about six-sevenths of the diameter of AME. Clypeus strongly receding and with a recess between it and base of chelicerae; apparently with a single long slender spine between each AME and other smaller and weaker spinules and bristles.

*Chelicerae.* Somewhat receding but essentially vertical and parallel; with basal boss moderately well developed; basal segment .758 mm. long; each with several very slender spines or bristles in front; with well marked fang groove studded with minute denticles; retromargin of fang groove with three teeth of moderate size, all in basal half with middle one somewhat the smallest; promargin with four teeth, the third from base being the largest; fang of moderate length, evenly curved and finely dentate along inner margin.

*Maxillae.* Essentially parallel; about two-thirds as broad as long; with a robust, strongly chitinized lateral tubercle opposed to a corresponding tubercle at base of palpal femur; with marginal serrula well developed at lateral distal corner; with well developed scopula along distal lateral medial corner and adjacent distal border (Fig. 12, from a dissected paratype).

*Lip.* Broader than long in ratio of about 4 : 3; with cross striations in basal third. Sternal suture indefinite, gently procurved.

*Sternum.* Narrowly scutiform; mildly convex; moderately scalloped opposite coxae; longer than wide in ratio of about 3 : 2; slightly the widest at interval between second and third coxae; posterior end continued as a very slender sclerite between fourth coxae which are separated only by a little more than one fifth of their width.

*Legs.* 1423. Width of first patella at "knee" .433 mm., tibial index of first leg 9. Width of fourth patella at "knee" .379 mm., tibial index of fourth leg 9.



	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.095	1.430	3.640	3.900	1.365	14.430
2.	3.380	1.235	2.795	3.250	1.150	11.810
3.	2.285	.845	1.267	1.495	.845	6.737
4.	3.965	1.267	2.795	2.990	1.040	12.057
Palp	.585	.330	.220	—	1.105	2.240

*Spines.* First leg: femur dorsal and prolateral 0-0-1-1-1, retrolateral 0-0-0-0-1-1, ventral with six or seven along retromargin and two or three along promargin, all in distal half; patella dorsal 0-1, prolateral and retrolateral 1-1; tibia dorsal 0-1-0-1-1-0, prolateral 1-1-1-1-1-0 on right but with six on left, retrolateral 0-1-0-1-0, ventral 2-2-lr-lp-2-lp-2; metatarsus dorsal 0-1-0-1-0-0, prolateral 0-0-1-0-1-0, retrolateral 0-1-0-1-0, ventral 2-2-2 with considerable irregularity. Second leg: femur dorsal as in first, prolateral only one near distal end, retrolateral 0-0-0-1-1-1, ventral a row of nine short but robust spines extending to retromargin distally (Fig. 14); patella as in first; tibia dorsal 1-0-1-1-0, prolateral 1-1-1-1-1, retrolateral 0-1-1-1, ventral 2-lp-2-2-lp-2 (prolateral and ventral spines appear to be modified for a common use, Fig. 13); metatarsus dorsal 0-1-0, prolateral 0-1-0-0-0, retrolateral 0-1-0-1-0, ventral 0-2-2-0. Third leg: femur dorsal 0-1-0-1-1, prolateral and retrolateral only one near distal end, ventral 0-0-2 (missing on left leg)-2; patella dorsal 1-1, prolateral and retrolateral only one near distal end; tibia dorsal 1-0-1, prolateral 1-1-1, retrolateral 0-1-1, ventral lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-1, retrolateral 0-1-0, ventral 0-1-1-1 (all median). Fourth leg: femur dorsal 0-1-0-1-1, prolateral 0-0-1-1-1 (left) and 0-0-0-1-1 (right), retrolateral 0-0-1-1-1, ventral only two near distal end; patella as in third; tibia dorsal 0-1-0-1-1-0, prolateral 1-1-0-1-1 (left) and 1-1-1-1-1 (right), retrolateral 1-0-1-0, ventral 2-2-2-2 (right) and 2-lp-lr-lp-2 (left); metatarsus dorsal 0-1-0-1-0-0, prolateral 0-1-0-1, retrolateral 0-1-0-1-1-0, ventral 2-lp-lp-2. Palpal patella with a weak proximal dorsal spine and a single distal dorsal long slender spine. Palpal tibia with many long bristles and a single distal dorsal long slender spine. There are apparently six trichobothria of varying length also on the dorsal side of the tibia.

*Palp.* Very complicated; the trochanter has a strongly chitin-

ized tubercle which appears to act with those on the maxilla and femur as already recorded (Fig. 12); patella very short, simple, strongly chitinized; tibia very short and trilobed, with the ventral lobe provided with a strongly chitinized ventral rim. Tarsus very characteristic; basal apophysis a distorted arrow-shape; the clavis is robust, very broad and deeply excavated at its anterior end; the uncus is a sharply pointed tooth; the conductor has a broad central portion with three very characteristic extensions; the vesicle is small, strongly chitinized, and provided with a lobule; the embolus is flat, rather short and curved; the terminal laminae are raised into three prominences (Figs. 15-16).

*Abdomen.* Elongate as in *E. fusco-vittata* (Keys.); longer than wide in a ratio of a little more than 2 : 1; widest about one-third of length from base; overlaps abdomen only slightly; extends behind posterior margin of spinnerets about one-ninth of its length; anal tubercle a short robust prominence strongly chitinized at base; six spinnerets as usual in the genus; colulus a small tubercle with several short erect dark bristles; tracheal spiracle slightly in front of colulus and with a moderately chitinized ventral lip; with a small rounded brown sclerite between colulus and tracheal spiracle.

*Color in alcohol.* Carapace yellowish with darker flecks and with considerable reddish brown around the eyes; sternum grayish; legs and mouth parts generally yellowish but first and second pairs of legs and fourth tibiae have broad brown bands indefinitely delimited. Abdomen: there is a broad dark dorsal folium extending throughout and divisible into three narrower components; lateral to the folium is a light stripe on each side beneath which occurs a dark stripe; the venter has a median broad dark stripe with a narrow light yellowish stripe on each side. In some paratypes the dorsolateral light stripes have reddish areas but the color appears to be less variable in this species than in many others within the genus.

*Female allotype.* Total length 9.88 mm. Carapace 3.445 mm. long; 2.60 mm. wide opposite second coxae where it is widest; .975 mm. tall and, therefore, about .38 as tall as wide; broader in front than in male. Otherwise essentially as in male.

*Eyes.* Seen from above, both rows less strongly recurved than in male; ocular tubercles less prominent than in male; central ocular quadrangle almost exactly as long as wide in front. Ratio

of eyes AME : ALE : PME : PLE = 6 : 5 : 6 : 5. AME separated from one another by nearly 1.5 times their diameter, from ALE by slightly less than 3.5 times their diameter. PME separated from one another by nearly their diameter, from PLE by slightly more than four times their diameter. Laterals separated by about two-fifths of their diameter. Height of clypeus slightly less than diameter of AME. Clypeus with numerous long stiff bristles.

*Chelicerae*. Basal segment 1.105 mm. long; teeth along fang groove more robust than in male. Otherwise essentially as in male.

*Maxillae* and *Lip*. Essentially as in male except for maxillary tooth in the latter.

*Sternum*. Longer than wide in ratio of 24 : 17; with rather marked convexities opposite third coxae, less prominent convexities opposite first coxae and hardly any opposite second coxae. Otherwise essentially as in male.

*Legs*. 1243. Width of first patella at "knee" .466 mm., tibial index of first leg 8. Width of fourth patella at "knee" .466 mm., tibial index of fourth leg 10.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.420	1.852	4.030	3.900	1.250	15.472
2.	4.030	1.690	3.575	3.705	1.170	14.170
3.	2.470	.910	1.495	1.690	.910	7.475
4.	4.225	1.560	3.185	3.575	1.170	13.715

*Spines*. First leg: femur dorsal 0-1-1 (both small), prolateral 0-0-1-1-1, retrolateral only one near distal end; patella dorsal 1-1, prolateral 0-1-1-0, retrolateral 0-1 on right and 1-1 on left; tibia dorsal 0-1-0-1-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-lp-lp-lr-2; metatarsus dorsal 0-1-0-0-0, prolateral 0-1-0-1-0, retrolateral 0-0-0-1-0, ventral 2-2-0-0 with some troublesome irregularities. Second leg: essentially as in first with some variations. Third leg: femur dorsal, prolateral, and retrolateral with a single spine near distal end; patella appears to have only dorsal 1-1; tibia dorsal 0-1-0-0, ventral lp-lp-2 (hardly more than stiff bristles); metatarsus dorsal 0-1-0, prolateral 0-1-1-0, ventral 2-lp-lp-lp-lp (and many spine-like bristles). Fourth leg: femur as in third; patella dorsal 1-1 (both weak), prolateral and retro-

lateral 0-1-0; tibia dorsal 0-1-0-0-1-0, prolateral 0-1-1-1, retrolateral 0-1-1; metatarsus dorsal 0-1, prolateral 0-0-1-0-1-1, retrolateral 0-1-1-0, ventral 2(irregular)-lp-lp-lr. Palpal claw pectinate in a single row of slender teeth diminishing in length toward base. Palpal spines: femur with a single dorsal distal spine; patella dorsal 1-1; tibia dorsal 0-0-1-0, prolateral 1-1, retrolateral only one distal; tarsus with numerous spines and spine-like bristles irregularly arranged.

*Abdomen.* Bluntly pointed at both ends; a little more than twice as long as wide. Otherwise essentially as in male.

*Epigynum.* Very distinctive; base nearly circular in outline as seen in ventral view; scape long, slender, arising from near the center of base (Figs. 17-18).

*Color in alcohol.* Closely resembles that of male but the dorsal folium is more broken and less distinct than in that sex.

*Type locality.* Male holotype from Barro Colorado Island, C. Z., July, 1950. Female allotype from the same locality, July, 1936. Paratypes of both sexes from the following localities: Barro Colorado Island, July, 1924 (Banks); June-July, 1936; July-August, 1939; August, 1946 (L. H. Krauss); July, 1950; Canal Zone Forest Reserve, C. Z., July, 1939 and August, 1950; France Field, C. Z., August, 1939.

#### EUSTALA ABDITA sp. nov.

(Figures 19-23)

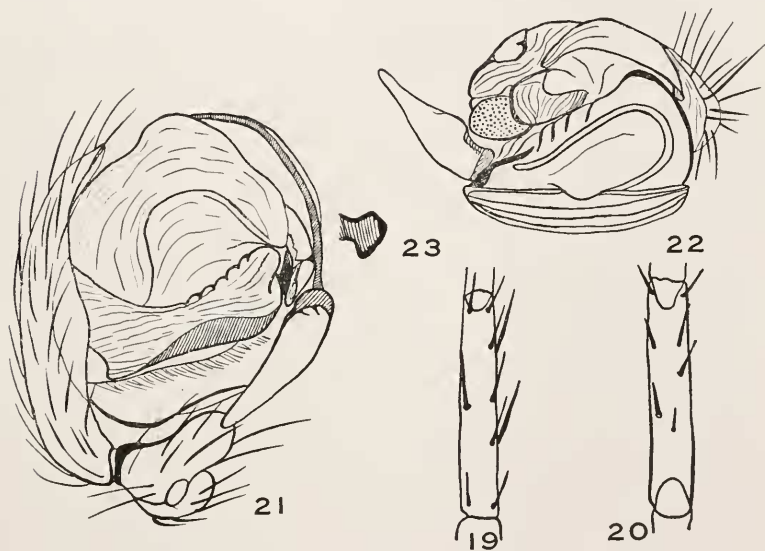
*Male holotype.* Total length 3.445 mm. Carapace 1.69 mm. long; 1.43 mm. wide between second coxae where it is widest; .704 mm. tall and, therefore, nearly .50 as tall as wide; with well developed longitudinal thoracic groove; spines confined to ocular region.

*Eyes.* Eight in two rows, all dark. Viewed from above, both rows strongly recurved; viewed from in front, anterior row moderately procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 16 : 13, wider in front than long in ratio of 16 : 13. Ratio of eyes AME : ALE : PME : PLE = 9 : 6 : 8 : 5.5. AME separated from one another by one and one-third times their diameter, from ALE by one and one-half times their diameter. PME separated from one

another by one and one-fourth times their diameter, from PLE by slightly more than three times their diameter. LE separated from one another by two-thirds the diameter of ALE. Height of clypeus equal to one and one-third times the diameter of AME. A pair of long slender spines occurs dorsal to LE; also a row of spine-like bristles between ME.

*Chelicerae*. Basal segment .433 mm. long. Fang groove well marked. Promargin of fang groove with three teeth, the middle one small; retromargin with four teeth, the second and fourth small, the other more robust (teeth observed on dissected paratype to avoid injury to holotype). Fang evenly curved, finely dented along inner margin.

*Maxillae*. Parallel; full and convex on retrolateral surface; scopula well developed along medial surface and inner distal



External Anatomy of *Eustala*  
Figures 19-23, *E. abdita* sp. nov.

- Fig. 19. Right second tibia from below.  
Fig. 20. Left fourth femur from below.  
Fig. 21. Left palpal tarsus, lateral view.  
Fig. 22. Left palpal tarsus from in front.  
Fig. 23. Basal tarsal apophysis.

angle. Serrula moderately well developed along outer distal angle. With well developed basal tubercle to oppose the chitinous ridge on palpal femur; also with a chitinous ridge extending basally from the tubercle.

*Lip.* Wider than long in ratio of about 22 : 15; distal third along border full and well rounded; reaches only slightly beyond middle of maxillae. Sternal suture gently procurved.

*Sternum.* Generally scutiform; longer than wide in ratio of 35 : 26; a sclerite continues from posterior end between fourth coxae which are barely separated; covered by numerous long curved bristles.

*Legs.* 1243. Width of first patella at "knee" .238 mm., tibial index of first leg 8. Width of fourth patella at "knee" .206 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.892	.812	2.265	1.787	.785	8.551
2.	2.047	.715	1.430	1.462	.715	6.369
3.	1.200	.455	.650	.611	.520	3.442
4.	1.950	.650	1.200	1.200	.585	5.585
Palp	.314	.184	.141	—	.790	1.429

First coxa with well developed ventral distal hook on retro-margin; prolateral groove and ridge at base of second femur extends a little less than one-fifth of the length of the segment; the dorsal tubercle on first coxa moderately well developed.

*Spines.* First leg: femur dorsal 0-0-1-0-1-1, prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1-1, ventral 0-0-lp-lp-2; patella dorsal, three bristles in a median row-1, prolateral and retrolateral 0-1-1; tibia dorsal 0-1-0-1-1-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-2-2-lp-2; metatarsus dorsal 0-1-1-0-0, prolateral 0, retrolateral 0-0-1-0, ventral 1r-2-lp-0. Second leg: femur dorsal and retrolateral as in first, prolateral 0-0-0-1-1, ventral 0-0-lp-lp-lp; patella essentially as in first; tibia ventral 2-lp-2-lp-2 (Fig. 19), elsewhere as in first; metatarsus dorsal 0-1-0, prolateral 0, retrolateral 0-1-1, ventral 0-lp-lr-lp-0. Third leg: femur dorsal 0-0-1-1-1, prolateral and retrolateral only one near distal end, ventral 0-lp-lp-2-0; patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral 0-0-1-0, retrolateral 0-0-1, ventral lp-lp-2; metatarsus dorsal 0-1-1-0, prolateral 0-1-0, retro-



lateral 0, ventral 0-1-1-0 (both weak). Fourth leg: femur ventral 0-2-lr-lr-2 on right and 0-2-lr-2-2 on left (Fig. 20), elsewhere as in first; patella essentially as in third; tibia dorsal as in third, prolateral 1-1-1-1, retrolateral 0-1-1, ventral lp-lp-lp-2; metatarsus dorsal 1-1-0, prolateral 0-1-1-1, retrolateral 0-0-1-0, ventral 0-lp-lp.

*Palp.* Complicated; the basal ventral femoral tubercle or ridge opposing the maxillary tooth is moderately well developed; the patella is short and has a single long dorsal distal spine and a weak proximal one; the tibia is short, trilobed as usual with the articular lobe provided with the usual strongly chitinized thin lamina opposed to the strongly chitinized base of the tarsus. Tarsus: the basal tarsal apophysis is more nearly arrow-shaped than in some species; the elavis is moderately robust, unexcavated at its base but it has a basal modified articular surface; the uncus is a short hook, more or less hidden against the conductor; the conductor itself is simpler than in some species but its distal end has two clearly distinguishable surfaces; the vesicle is largely hidden within; the embolus is either modified into a broad thin plate or hidden; the terminal laminae are expanded into a bulbous structure containing a prominent tubule and a median tubercle; cuspules on conductor and laminae are almost lacking (Figs. 21-23).

*Abdomen.* Total length 1.95 mm.; rounded at both ends with triangular form obscured; longer than wide in ratio of 15 : 13; widest about one third from base; well covered dorsally by moderately long slender spines. Otherwise essentially as usual in the genus.

*Color in alcohol.* Carapace yellowish with brownish spots in vicinity of thoracic groove; with a pair of dots near the posterior end of the groove. All eyes except AME ringed with black pigment. Sternum with an irregular grayish border; elsewhere yellowish flecked with gray. Mouth parts yellowish. Legs yellowish with few brownish bars which are most prominent on femora. Abdomen: dorsal folium poorly indicated; dorsum variegated yellowish elsewhere; venter yellowish, granulated with yellowish-white subchitinous deposits. Two of the paratype males are more deeply colored with the pattern somewhat different from that of the holotype.

*Type locality.* Male holotype from Huajuapán, Oaxaca, Mexico, Sept., 1946 (H. Wagner). Five male paratypes from the following localities in Mexico: Huajuapán, Oaxaca, Sept., 1946 (H. Wagner); Vera Cruz (Crawford); Teomixla, Morelos, August, 1942 (H. Wagner); Santiago, Colima, January, 1943 (F. Bonet).

Note: Until recently this species has been regarded as the male of *E. mexicana* sp. nov. At the present time this seems less likely.

EUSTALA ANASTERA (Walck.), 1837

(Figures 24-29)

*Epeira anastera* Walckenaer, 1837

*E. cepina* Walckenaer, 1837

*E. bombicinaria* Hentz, 1847

*E. prompta* Hentz, 1847

*E. parvula* Keyserling, 1863

*E. parvula* Emerton, 1885

*E. bombicinaria* Keyserling, 1892

*E. anastera* McCook, 1893

*E. anastera* Simon, 1894

*E. parvula* Emerton, 1902

*Eustala anastera* F. P. Cambridge, 1904

*Epeira anastera* Banks, 1909

*Eustala anastera* Petrunkevitch, 1911

*E. leuca* Chamberlin, 1924

*E. buliafera* Chamberlin, 1924

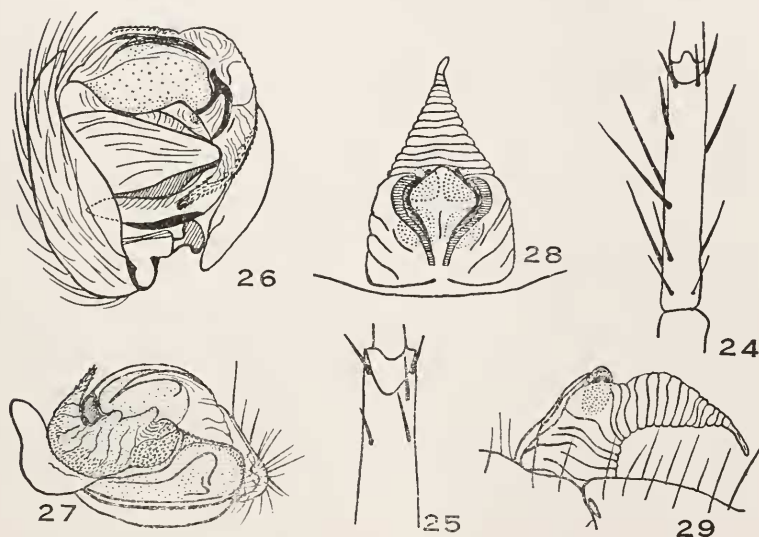
*E. anastera* Petrunkevitch, 1930

*Male hypotype.* Total length 4.03 mm. The hypotype has the more rounded abdomen which seems to be the usual form in the males of this species. Central ocular quadrangle wider in front than behind in ratio of 29 : 25, wider in front than long in about the same ratio. Ratio of eyes AME : ALE : PME : PLE = 9 : 6 : 8 : 6.5. AME separated from one another by one and one-third times their diameter, from ALE by nearly two diameters. PME separated from one another by about one and one-fourth times their diameter, from PLE by slightly more than three diameters. Laterals separated from one another by slightly less than the diameter of ALE. Height of clypeus equal to eight-



ninths of the diameter of AME. Promargin of fang groove with four teeth, second and fourth small, others of moderate size; retromargin with three teeth of moderate size. Secondary sexual characters on first coxa, maxillae, and adjacent palpal segments together with the prolateral ridge and groove on the second femur appear as usual in the genus. Sternum longer than wide in ratio of 35 : 31.

*Legs.* 1243. Width of first patella at "knee" .271 mm., tibial index of first leg 9. Width of fourth patella at "knee" .249 mm., tibial index of fourth leg 13.



External Anatomy of *Eustala*

Figures 24-29, *E. anastera*

- Fig. 24. Left second tibia from below.
- Fig. 25. Left fourth femur from below.
- Fig. 26. Male palpal tarsus, lateral view.
- Fig. 27. Male palpal tarsus from in front.
- Fig. 28. Epigynum from below.
- Fig. 29. Epigynum, lateral view.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.600	.942	2.080	1.657	.715	7.994
2.	2.080	.845	1.430	1.462	.650	6.467
3.	1.365	.575	.682	.660	.487	3.769
4.	1.950	.770	1.170	1.170	.520	5.580
Palp	.303	.217	.141	—	.845	1.506

The second femur has only one weak spine near distal end on the retromargin; ventral spines on fourth femur as shown in Figure 25. The ventral and related spines on the second tibia are as shown in Figure 24.

*Palp.* Complicated and characteristic; features of the femur, patella and tibia appear to be typical of the genus. Tarsus: the basal tarsal apophysis is quite unlike the typical arrow head shape; the clavis is robust, unexcavated at its base; the uncus is stout and twisted; the conductor is massive, extensively setose, and drawn out distally into a characteristically narrow extension unlike that of any other species in Central America; the vesicle is of moderate size; the embolus is of moderate length and size, and is lance-like apically; the terminal laminae are also massive and setose (Figs. 26-27).

*Color in alcohol.* The carapace is light brown with darker flecks. The sternum is mottled brown. The legs are light brown with faint darker spots. The abdomen has a poorly defined folium. The venter has a faintly defined dark quadrilateral area between the genital groove and the base of the spinnerets; the dark area contains a poorly defined light spot. Other specimens show much variation in the color pattern with the ventral light spot usually much clearer.

*Female hypotype.* Total length 7.15 mm. (probably above the average for females in this species).

*Legs.* 1243. Width of first patella at "knee" .455 mm., tibial index of first leg 11. Width of fourth patella at "knee" .379 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.380	1.495	2.665	2.600	.975	11.115
2.	2.990	1.365	2.340	2.275	.910	9.880
3.	1.950	.845	1.040	1.170	.715	5.720
4.	2.860	1.300	1.950	2.015	.780	8.905

There are two long and fairly robust spines on the first femur near the middle, one prolateral and one ventral. Not all females appear to have these spines.

*Epigynum*. Easily confused with that of *E. bifida* and, perhaps, others in the genus; this is especially true of some of the deviates in the species concerned. The apertures are about one third of the width of the scape at their level from the lateral margin (Figs. 28-29).

*Abdomen*. With the usual general form except that there are three dorsoventrally arranged posterior tubercles thus giving a marked trifold appearance to this part of the body. This emphasizes the widespread variation of details of form of the abdomen in this species.

*Color in alcohol*. The carapace is dark brown along the middle, lighter on the lateral sides. Sternum is grayish. Legs with many dark brown bands. Abdomen: the dorsal folium is fairly well defined; the remainder of the dorsum and lateral sides are dark variegated with many lighter spots; there is a vaguely defined ventral whitish spot in the middle of a median darker area.

*Type locality*. Male hypotype from Amatitlan, Guatemala, August, 1947 (C. & P. Vaurie); female hypotype from San Juan del Rio, Durango, Mexico, August, 1947 (W. J. Gertsch). Males and females from many localities in Mexico and Guatemala have been examined. The Cambridges reported the species from Costa Rica but, so far as I know, it has not been taken in Panama.

Note: The male paratypes of *E. anastera buliafera* Chamberlin in the Museum of Comparative Zoology are clearly *E. anastera* (Walck.) but there is a question regarding the females. It seems likely that the females belong to more than one species.

#### EUSTALA BANKSI sp. nov.

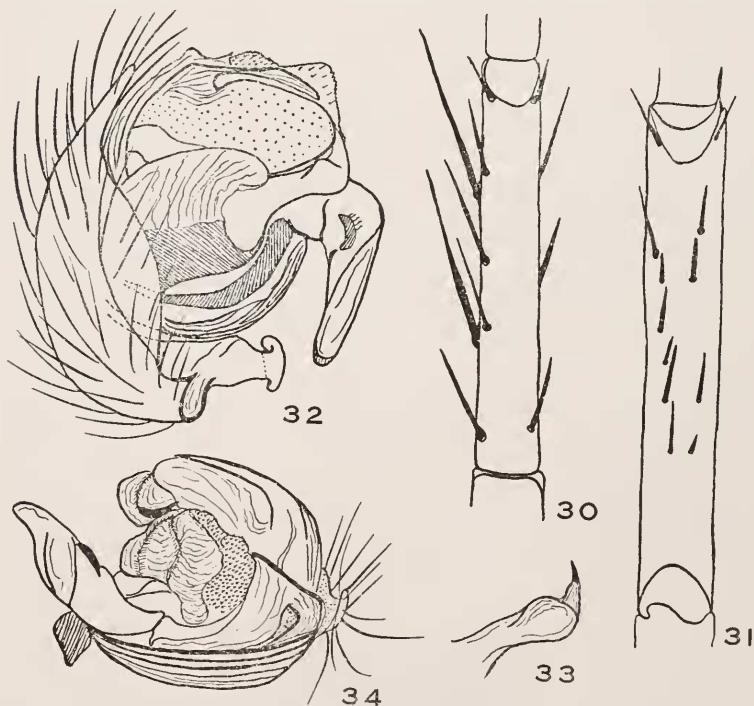
(Figures 30-34)

This species has previously been considered by Mr. Banks and perhaps others as well as myself to belong to *E. bifida* F. P. Cambridge. A closer study reveals so many differences from that species, however, that according to my present views concerning species it must be regarded as new to science. A holotype has, therefore, been selected and is described in accord with my

usual formula. This specimen is not in the best of condition but is the best available.

*Male holotype.* Total length 5.98 mm. Carapace 3.055 mm. long, 2.535 mm. wide opposite intervals between second and third coxae where it is widest; .975 mm. tall and, therefore, about .38 as tall as wide; only slightly raised from PME to beginning of posterior declivity; with a well developed median longitudinal groove; apparently with few spines, restricted to ocular region.

*Eyes.* Eight in two rows, all dark; LE on moderately prom-



External Anatomy of *Eustala*  
Figures 30-34, *E. banksi* sp. nov.

- Fig. 30. Left second tibia from below.  
Fig. 31. Right fourth femur from below.  
Fig. 32. Left male palpal tarsus, lateral view.  
Fig. 33. Uncus, somewhat enlarged from Figure 32.  
Fig. 34. Left male palpal tarsus from in front.

inent tubercles; a low conical prominence in middle of median ocular quadrangle from which two long slender spines protrude; viewed from above, both rows strongly recurved; viewed from in front, anterior row moderately procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of about 9 : 7, wider in front than long in ratio of 9 : 8. Ratio of eyes AME : ALE : PME : PLE = 13 : 10 : 11.5 : 7. AME separated from one another by slightly more than 1.5 times their diameter, from ALE by nearly two and one-fourth times their diameter. PME separated from one another by about four-thirds of their diameter, from PLE by four times their diameter. Laterals separated from one another by the diameter of PLE. Height of clypeus equal to about five-thirds of the diameter of AME.

*Chelicerae.* Essentially parallel, but distal half somewhat excurved; with moderately well developed basal boss; basal segment .65 mm. long. Fang groove well defined; promargin with four teeth, the fourth small; retromargin with three fairly robust teeth.

*Maxillae.* In general, typical of the genus including the lateral tooth opposing the modifications on the palpal femur and trochanter.

*Lip.* Wider than long in ratio of about 4 : 3; bluntly pointed distally; extends only a little beyond middle of maxillae; basal half somewhat grooved. Sternal suture very slightly procurved.

*Sternum.* Elongate-scutiform; longer than wide in ratio of 29 : 20; a sclerite continues from posterior end between fourth coxae which are separated by one-eighth of their width; with numerous long slender bristles.

*Legs.* 1243. Width of first patella at "knee" .433 mm., tibial index of first leg 8. Width of fourth patella at "knee" .379 mm., tibial index of fourth leg 10.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.095	1.560	3.575	3.705	1.235	14.170
2.	3.510	1.235	2.600	2.470	<sup>1</sup> 1.000	10.815
3.	2.535	.910	1.300	1.495	.780	7.020
4.	3.175	1.365	2.210	2.632	1.170	10.357
Palp	.444	.282	.217	—	1.105	2.048

<sup>1</sup> Lacking in holotype; length estimated.

First coxa with a well developed ventral distal hook; prolateral proximal groove and ridge on second femur well developed and extending slightly more than one-fifth of total length of segment; the dorsal tubercle on first coxa moderately well developed.

*Spincs.* First leg: femur dorsal 0-0-1-1-1-1, prolateral 0-0-1-1-1, retrolateral 0-0-0-0-1-1, ventral in distal half three on promargin and five on retromargin; patella dorsal 1-1-1, prolateral and retrolateral 0-1-1-0; tibia dorsal 0-1-1-1-1-0, prolateral and retrolateral 0-1-1-0, ventral 0-2-lp-lp-lp-2; metatarsus dorsal 0-1-1-1-0, prolateral 0-0-1-0, retrolateral 0-1-1-0, ventral 2-2-lr-2. Second leg: femur essentially as in first except ventral only one near distal end on promargin; patella as in first except dorsal 1-1 (bristle)-1; tibia essentially as in first except that prolateral and ventral promarginal spines are especially robust (Fig. 30); metatarsus dorsal 0-1-1-0, prolateral 0, retrolateral 0-0-1-0, ventral 2-2-2. Third leg: femur dorsal 0-1-0-1-1, prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1, ventral with a double series, four on promargin and six on retromargin; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0-1; tibia dorsal 1-0-1, prolateral 1-1-0, retrolateral 0-1-1, ventral 2-2 (irregularly placed)-2; metatarsus dorsal 1-0-0, prolateral 0-1-1, retrolateral 0-1-0, ventral 2-lp-lp-2. Fourth leg: femur dorsal as in third, prolateral only one near distal end, retrolateral 0-0-0-1-1, ventral essentially as in third; patella as in third; tibia dorsal 1-1-1, prolateral 1-1-0-1-1, retrolateral 0-1-0, ventral 2-2-lp-2; metatarsus dorsal 1-1-0, prolateral 0-1-1-0, retrolateral the same, ventral 2-lp-lp-lp.

*Palp.* Complicated; basal femoral ridge opposing the maxillary tooth moderately well developed; patella short, with a weak basal dorsal spine and a long slender distal dorsal spine; the tibia is as usual, trilobed, with a well developed chitinous collar on the ventral side of the articular lobe. Tarsus: the basal apophysis is a rounded structure without much resemblance to the typical arrow-head; the clavis is a fairly robust structure; the uncus is a robust hook with a long shank and a prominent hump at the base of the terminal hook; the conductor is a massive structure, extensively setose, and distally provided with a deep dorsoventral groove and other distinctive surfaces; the vesicle is moderately large; the embolus is short, slender, and lance-



like terminally; the terminal laminae are massive on the medial side but thin on the lateral half (Figs. 32-34).

*Abdomen.* Total length 2.787 mm.; with rounded triangular form; with what appears to be a suppressed posterior conical extension; longer than wide in ratio of about 4 : 3; with numerous long slender dorsal and dorsolateral spines; with other features essentially typical of the genus.

*Color in alcohol.* Carapace yellowish with faint brownish spots and streaks radiating from the median thoracic groove. The most conspicuous of these markings consist of the following: a minute dot on each side just in front of the median groove and a transverse row of four dots a little behind the middle of the furrow; from the second and third of these a narrow stripe extends posteriorly. Sternum light yellowish, flecked with gray. Legs yellowish with both broad and narrow brownish bands and rings. Abdomen: the dorsal folium obscurely outlined in dark brown with many white guanin granules; venter with a lighter area between the genital groove and base of spinnerets surrounded by a narrow brownish border.

*Type locality.* Male holotype from Ocosingo, Chiapas, Mexico, June, 1950 (Goodnight and Stannard). One male paratype from Turrialba, Costa Rica (Tristan).

#### EUSTALA BIFIDA F. P. Cambridge, 1904

(Figures 35-40)

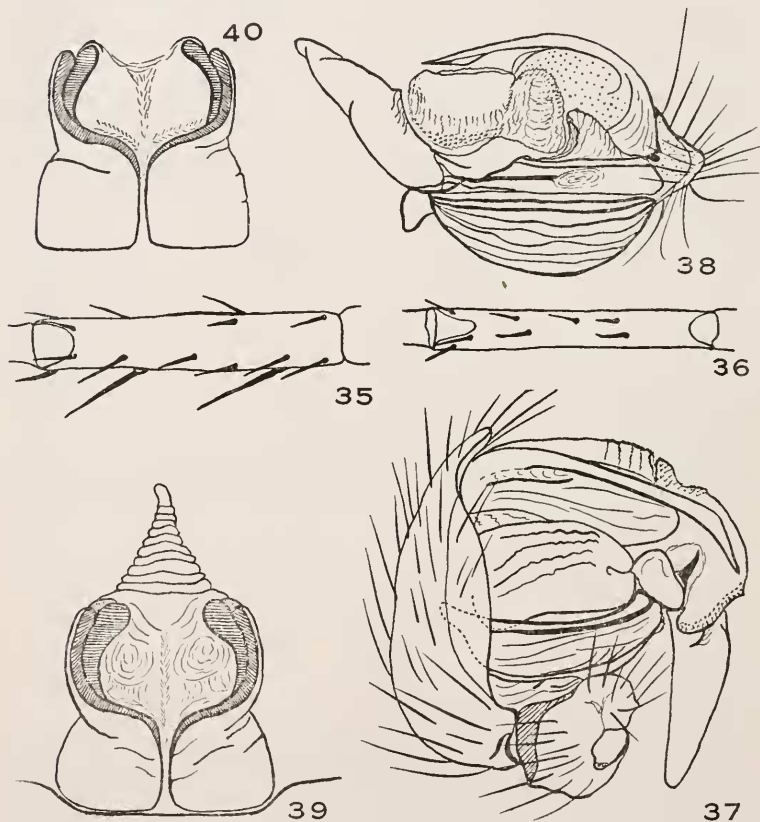
*Epeira bifida* Banks, 1909

*Eustala bifida* Petrunkevitch, 1911

As indicated in the treatment of *E. maxima* sp. nov., the females reported by Banks (1929) from Barro Colorado Island are now regarded as belonging to a species new to science. The specimens in the Museum of Comparative Zoology from La Verbena, Costa Rica, agree well with the specimens from the British Museum and with F. P. Cambridge's figures. All of the specimens from La Verbena are somewhat shrunken and distorted but are, nevertheless, easily identified.

*Male hypotype.* Total length 6.175 mm. The hypotype has the bifid condition at the posterior end of the abdomen but in a reduced degree. Central ocular quadrangle wider in front than

behind in ratio of 7 : 6 only slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 13 : 8 : 12 : 7.5. AME separated from one another by 1.5 times their diameter, from ALE by about 2.5 times their diameter. PME separated from



External Anatomy of *Eustala*  
Figures 35-40, *E. bifida*

- Fig. 35. Left second tibia from below.  
 Fig. 36. Right fourth femur from below.  
 Fig. 37. Left male palpal tarsus, lateral view.  
 Fig. 38. Left male palpal tarsus from in front.  
 Fig. 39. Epigynum from below.  
 Fig. 40. Epigynum; a more posterior view.



one another by 1.25 times their diameter, from PLE by about four times their diameter. Laterals separated from one another by about the diameter of ALE. Height of clypeus equal to slightly more than 1.5 times the diameter of AME. Promargin of fang groove with four teeth, second and fourth smaller than first and third; retromargin with three rather small teeth. Secondary sexual characters appear about as usual except that the ridge and groove on the promargin of the second femur is much shorter than usual.

*Legs.* 1243. Width of first patella at "knee" .455 mm., tibial index of first leg 9. Width of fourth patella at "knee" .444 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.225	1.690	3.477	3.600	<sup>1</sup> 1.300	14.292
2.	3.445	1.430	2.665	3.250	<sup>1</sup> 1.225	12.015
3.	2.535	.975	1.365	1.570	.845	7.290
4.	3.185	1.495	2.405	2.730	1.105	9.920
Palp	.498	.249	.238	—	1.029	2.014

The special ventral and prolateral spines on the second tibia are shown in Figure 35. The first femur has a double series of ventral spines apparently with three on the promargin and three or four on the retromargin, all in distal half. The second femur is essentially like the first in this respect. The third femur has one or two ventral spines on the promargin and three on the retromargin. The fourth femur has the most fully developed set of ventral spines with four on each margin (Fig. 36).

*Palp.* In very close agreement with the specimen from the British Museum. The features of the femur, patella, and tibia appear to be typical of the genus. Tarsus: basal tarsal apophysis is typical; the clavis is robust, unexcavated at base but with a short ridge as noted by F. P. Cambridge; the uncus has a transversely inflated base from which the point of the hook extends but there is no long shank; the conductor is massive, extensively setose, with a ventral depression for the reception of the point of the uncus, and with two characteristic surfaces at the distal end, one of which has a shallow groove; the vesicle is of moderate size but is well defined; the embolus is long, slender,

<sup>1</sup> Lacking in hypotype; length estimated.

and terminally lance-like; the terminal laminae are massive in the medial half and bear two poorly defined grooves in the reduced retrolateral half (Figs. 37-38).

*Color in alcohol.* Discolored by long preservation and, probably also, by drying out at some time. The dorsal folium was probably well defined. In all available specimens the venter has a somewhat elongated light spot in the center of what was probably a dark area behind the genital groove.

*Female hypotype.* Total length about 7.475 mm. (distorted and difficult to measure accurately). The bifid condition of the posterior end of the abdomen is fairly conspicuous in spite of the distortion.

*Legs.* 1243. Width of first patella at "knee" .601 mm., tibial index of first leg 11. Width of fourth patella at "knee" .585 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.225	1.950	3.575	3.380	1.365	14.495
2.	3.705	1.885	3.055	3.250	1.235	13.130
3.	2.600	1.105	1.495	1.690	.975	7.865
4.	3.640	1.820	2.697	2.925	1.105	12.187

There is a double series of weak ventral spines on the first femur, three on promargin and two on retromargin, all in distal half; there are also three prolateral femoral spines the first two of which are long and robust, all in distal half. The ventral femoral spines appear to be lacking on the second leg but the prolateral spines are three in number and all weak. The third and fourth femora appear to lack the ventral spines.

*Epigynum.* Similar to that of *E. maxima* sp. nov. There are quite definite though somewhat obscure differences in the pattern of tubules and their boldness together with the prominences in the expanded region from which the scape arises. These are best shown in Figures 39-40.

*Type locality.* F. P. Cambridge had this species only from Costa Rica. The only specimens available to me for study are also restricted to Costa Rica. The hypotypes and two other female specimens are from La Verbena, collected in January by Tristan and now a part of the Nathan Banks collection in the Museum of Comparative Zoology.

## EUSTALA BUCOLICA sp. nov.

(Figures 41-44)

*Male holotype.* Total length 3.835 mm. Carapace 1.982 mm. long; 1.755 mm. wide opposite third coxae where it is widest; .845 mm. tall and, therefore, about .48 as tall as wide; rises gradually from PME to beginning of steep posterior declivity opposite third coxae; with well developed median longitudinal thoracic groove; with no more than a weak covering of hair and with few spines or spinules and these confined to ocular area.

*Eyes.* As usual, eight in two rows, all dark; LE on moderately prominent tubercles; viewed from above, posterior row strongly recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of about 8 : 7, wider in front than long in ratio of about 16 : 15. Ratio of eyes AME : ALE : PME : PLE = 10 : 7 : 9 : 7. AME separated from one another by 1.5 times their diameter, from ALE by the same distance. PME separated from one another by 1.25 times their diameter, from PLE by three times their diameter. Laterals separated from one another by about two-thirds of their diameter. Height of clypeus equal to the diameter of AME.

*Chelicerae.* Basal segment .758 mm. long. Fang groove well defined and finely dentated; promargin with four teeth, the second and fourth smaller; retromargin with three teeth (observed on paratype to avoid injury to holotype). Otherwise as usual in the genus.

*Maxillae.* As usual in the genus in all observed features including the maxillary tooth which appears to be used in opposition to the basal palpal femoral ridge.

*Lip.* Wider than long in ratio of about 25 : 16; transversely grooved in proximal half; reaches to about the middle of maxillae. Sternal suture gently procurved.

*Sternum.* Scutiform; longer than wide in ratio of 7 : 6; a narrow sclerite continues between fourth coxae which are separated by about one-third of their width; with the usual supply of long slender spinules.

*Legs.* 1243. Width of first patella at "knee" .282 mm., tibial index of first leg 8. Width of fourth patella at "knee" .217 mm., tibial index of fourth leg 10.

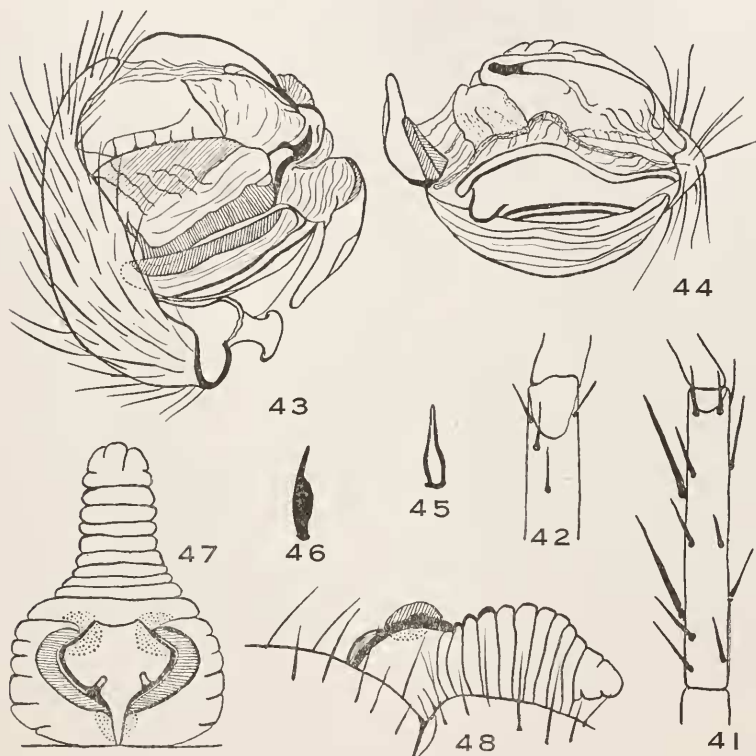
	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.990	1.012	2.405	2.156	.902	9.465
2.	2.200	.836	1.650	1.738	.792	7.216
3.	1.430	.550	.748	.770	.484	3.932
4.	1.980	.792	1.298	1.320	.616	6.006
Palp	.352	.220	.176	—	.704	1.452

The hook and tubercle on the first coxa and the ridge and groove on the second femur appear to be typical of the genus.

*Spines.* First leg: femur dorsal 0-1-1-1, prolateral left 0-1-1-1-1, right 0-0-1-1-1, retrolateral 0-0-1-1-1, ventral promargin 0-1-0-0-0 and retromargin 0-0-1-1; patella dorsal 1(weak)-1, prolateral 0-1-0, retrolateral 0-0-1; tibia dorsal 0-1-0-0-1-1-0, prolateral 0-1-0-1-0, retrolateral 0-1-1-0, ventral 2-lr-lp-lr-lp-lp-2; metatarsus dorsal 0-1-1-0, prolateral 0, retrolateral 0-1-0-1-0, ventral 0-2-lp-0. Second leg: femur dorsal and prolateral 0-1-1-1, retrolateral the same with slight variations, ventral only one on each margin near distal end; patella dorsal as in first, prolateral 1-1, retrolateral as in first; tibia dorsal 1-0-1-1-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-lp-2-lp-2 (Fig. 41); metatarsus dorsal 0-1-0, prolateral 0, retrolateral 0-1-1-0, ventral 0-2-lp-0. Third leg: femur dorsal 0-1-1-1, prolateral 0-0-1-1, retrolateral only one near distal end, ventral only two on promargin and one near distal end on retromargin; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-0; tibia dorsal 1-0-1, prolateral 1-1-0, retrolateral 0-1-0, ventral lp-lp-2; metatarsus dorsal and prolateral 0-1-0-0, retrolateral 0-1-0, ventral lp-lp-lp-lp(weak). Fourth leg: femur dorsal 0-1-1-1, prolateral and retrolateral only one near distal end, ventral promargin only one near distal end and three along retromargin, all in distal half (Fig. 42); patella as in third; tibia dorsal 1-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-1, ventral 2-lp-lp-2; metatarsus dorsal 1-1-0, prolateral 1-1-1-1, retrolateral 0, ventral 0-lp-lp-lp(weak).

*Palp.* Complicated; basal femoral ventral ridge, patella, and tibia typical of the genus. Tarsus: basal tarsal apophysis a typical distorted arrow-head shape; the clavis is moderately robust, somewhat concave ventrally at its base and provided with a marked carina along its basal lateral border; the uncus is a stout hook with a pronounced shoulder at its base; the conductor

is relatively small, less differentiated on its anterior surface than usual and only sparsely and very finely setose; the vesicle is in its typical position and of moderate size; the free part of the embolus is short and slender but its base extends nearly to



External Anatomy of *Eustala*  
 Figures 41-44, *E. bucolica* sp. nov.  
 Figures 45-48, *E. clavispinga*

- Fig. 41. Left second tibia from below.  
 Fig. 42. Right fourth femur from below.  
 Fig. 43. Left male palpal tarsus, lateral view.  
 Fig. 44. Left male palpal tarsus from in front.  
 Figs. 45-46. Two views of claviform abdominal spines.  
 Fig. 47. Epigynum from below.  
 Fig. 48. Epigynum, lateral view.

the border of the bulb; the terminal laminae are only moderately wrinkled but there is a very prominent tubercle present together with a large raised portion contiguous to the base of the conductor (Figs. 43-44).

*Abdomen.* Total length 2.275 mm.; 1.625 mm. wide; with the typical round-triangular form; with the usual long slender dorsal and dorsolateral spinules; other observed features typical of the genus.

*Color in alcohol.* Carapace yellowish with grayish flecks over the anterior half; a transverse row of four small brownish dots across near the posterior end of the thoracic groove and another transverse row of two dots near the anterior end of the groove. Sternum yellowish with a grayish margin. Legs as usual, yellowish with brownish spots, bars, and rings. Abdomen: with a well developed dorsal folium subject to many variations among paratypes; the holotype has a conspicuous round, central, deeply colored, brown spot just in front of the middle of the folium but this is not persistent among the paratypes; the venter has a dark quadrilateral area between the genital groove and the base of the spinnerets and this has a very narrow dark lateral border enclosing a curved light colored mark on each side ending in a small posterior whitish spot but these are all subject to much variation among the paratypes.

*Type locality.* The holotype male is from Boquete, R. P., August, 1939. Several male paratypes from the same locality, August, 1939, 1950; one male paratype from El Volcan, R. P., February, 1936 (W. J. Gertsch).

### EUSTALA CLAVISPIA (O. P. Cambridge), 1889

(Figures 45-48)

*Epeira clavispi*a O. P. Cambridge, 1889

*E. clavispi*a Keyserling, 1892

*Amamra nigromaculata* O. P. Cambridge, 1895

*Eustala clavispi*a F. P. Cambridge, 1904

*E. clavispi*a Petrunkevitch, 1911

This species has not yet appeared in my collection nor has it been found in any of the material loaned me from the American Museum or available for study in the Museum of Compara-



tive Zoology. The only specimens I have seen are those loaned from the British Museum. These have enabled me, however, to form a clear conception of the female of the species. One of these females has been made the source of the following data and thus becomes the hypotype.

*Female hypotype.* Total length 6.467 mm. The abdomen shows a slight tendency to be bilobed at its base and is quite distinctly bifid at its posterior end as in *E. bifida*. There is also a distinct low cone in the area enclosed by the central ocular quadrangle; above and medial to ALE there is also a distinct convexity. The central ocular quadrangle is almost as wide behind as in front; slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 10 : 7.5 : 11 : 8.5. AME separated from one another by 1.5 times their diameter, from ALE by about three times their diameter. PME separated from one another a little more than their diameter, from PLE by a little more than four times their diameter. Laterals separated from one another by the diameter of PLE. Height of clypeus equal to a little less than twice the diameter of AME. Promargin of fang groove with four teeth, the second and fourth the smallest; retromargin with three teeth. Perhaps the most distinctive feature of this species is the curious type of spinule common on the dorsal and dorsolateral parts of the abdomen and on at least certain segments of the legs (Figs. 45-46). A pair of these unusual spinules also occurs on the tip of the low ocular cone in central ocular quadrangle.

*Legs.* 1243. Width of first patella at "knee" .401 mm., tibial index of first leg 10. Width of fourth patella at "knee" .368 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.185	1.462	2.730	2.600	1.040	11.017
2.	2.795	1.300	2.275	2.340	.975	9.685
3.	1.852	.715	1.007	1.170	.715	5.459
4.	2.600	1.365	1.755	2.015	.780	8.515

Ventral femoral spines are few or lacking; the first femur has a pair of slender spinules in the position 0-lr-lr-0; the second femur has a similar series of four as follows: lr-lr-lr-lr-0.

*Epigynum.* Base with the usual general pattern of tubules,



apertures, and striations; the base is relatively broad and massive (Figs. 47-48).

*Color in alcohol.* The dorsum of the abdomen is clay-yellow with a poorly defined folium; laterally there is a series of narrow brownish bands rising from the venter and ending dorsolaterally in brownish lines; these latter alternate with whitish bands from the dorsum which point ventrally; the venter is sprinkled with whitish granules concentrated toward the center between the genital groove and base of the spinnerets.

*Type locality.* The hypotype is from Teapa, Tabasco, Mexico (H. H. Smith), included among three specimens from the British Museum from the Godman and Salvin collection, April, 1905. F. P. Cambridge had specimens from Mexico and Guatemala.

#### EUSTALA CONFORMANS Chamberlin, 1925

(Figures 49-50)

*E. conformans* Banks, 1929

Banks (1929) had doubts about the validity of this species but, after a careful study of the holotype female, I am forced to accept it as a true species. All of my specimens referred to this species are considerably larger than the holotype but the epigyna agree remarkably well. I have, therefore, little doubt of the accuracy of the identification.

*Female hypotype.* Total length 6.175 mm. The general structure appears to be quite typical of the genus; there is a slight convexity between AME and PME from which a pair of slender spines extend; the carapace is covered by a well developed coat of whitish hair, raised into a tuft behind the LE; there is barely a suggestion of shoulder humps; the leg spines appear to be developed as usual in the genus. The central ocular quadrangle is only slightly wider in front than behind and only slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 11.5 : 9 : 11 : 8. AME separated from one another by about 1.2 times their diameter, from ALE by twice their diameter. PME separated from one another 1.3 times their diameter, from PLE by a little less than four times their diameter. Laterals separated from one another by two-thirds of the diameter of ALE. Height of clypeus equal to 1.3

times the diameter of AME. Promargin of fang groove with the usual four teeth and the retromargin with three teeth.

*Legs.* 1243. Width of first patella at "knee" .390 mm., tibial index of first leg 11. Width of fourth patella at "knee" .379 mm., tibial index of fourth leg 14.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.665	1.300	2.210	2.080	.910	9.165
2.	2.567	1.170	1.885	1.917	.877	8.416
3.	1.690	.585	.845	1.100	.660	4.880
4.	2.600	1.170	1.630	1.852	.845	8.097

Ventral spines appear to be completely lacking from the femora.

*Epigynum.* Somewhat resembles that of *E. semifoliata* but it is relatively broader and shorter; the apertures are much closer together than in *E. semifoliata*; there is a large dark area on each side of the base, not noted in any other species (Figs. 49-50).

*Color in alcohol.* Carapace yellowish with no dots or spots such as so frequently occur. Sternum yellowish with a grayish margin. The legs are yellowish with a few brown bars and spots. Abdomen: the dorsal folium is almost completely lacking with the dorsal and dorsolateral regions yellowish white from numerous subchitinous granules; the venter has a large area between the genital groove and base of spinnerets outlined irregularly with a white margin and containing a somewhat aviform black figure; this ventral pattern appears quite constant in all specimens recently collected but there is great variation among these in respect to other color features.

*Type locality.* The hypotype is from the Barro Colorado Island, C. Z., May, 1946 (Schnierla). Four other specimens from the same locality are in the collection: February, 1936 (Gertsch); May, 1946 (Schnierla); July, 1950.

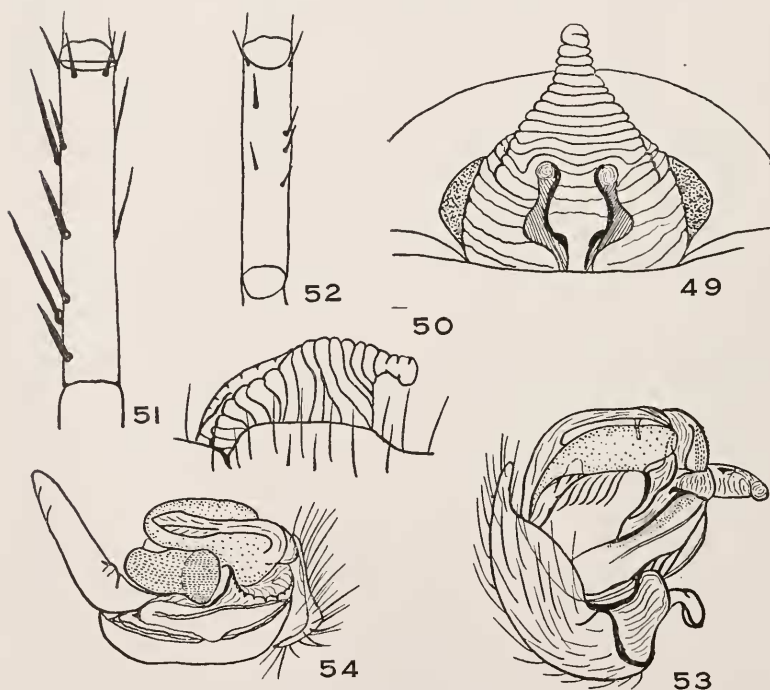
#### EUSTALA DELECTA sp. nov.

(Figures 51-54)

*Male holotype.* Total length 5.330 mm. Carapace 2.535 mm. long; 2.210 mm. wide opposite interval between second and third coxae; .845 mm. tall and, therefore, about .38 as tall as wide;

rises gently from PME to beginning of steep posterior declivity; with well developed median thoracic groove; with spines apparently confined to the ocular area.

*Eyes.* As usual, eight in two rows, all dark; LE on moderately prominent tubercles, viewed from above, posterior row moderately recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider



External Anatomy of *Eustala*  
 Figures 49-50, *E. conformans*  
 Figures 51-54, *E. delecta* sp. nov.

- Fig. 49. Epigynum from below.  
 Fig. 50. Epigynum, lateral view.  
 Fig. 51. Left second tibia from below.  
 Fig. 52. Left fourth femur from below.  
 Fig. 53. Left male palpal tarsus, lateral view.  
 Fig. 54. Left male palpal tarsus from in front.

in front than behind in ratio of 44 : 39, wider in front than long in the same ratio. Ratio of eyes AME : ALE : PME : PLE = 13 : 8 : 11 : 9. AME separated from one another by about 1.66 times their diameter, from ALE by a little less than twice their diameter. PME separated from one another by about 1.7 times their diameter, from PLE by a little less than four times their diameter. Laterals separated from one another by nearly three-fourths of the diameter of ALE. Height of clypeus equal to 1.15 times the diameter of AME.

*Chelicerae*. Basal segment .747 mm. long. Fang groove well defined; apparently with four teeth on promargin and three on retromargin as usual. Otherwise essentially typical of the genus.

*Maxillae*. In general quite typical of the genus including the maxillary tubercle used in opposition to the palpal femoral ridge.

*Lip*. Wider than long in ratio of about 4 : 3; hence somewhat narrower than usual in the genus; reaches to about the middle of the maxillae. Sternal suture difficult to see but apparently somewhat procurved.

*Sternum*. Scutiform; longer than wide in ratio of about 9 : 7; a narrow sclerite continues between the fourth coxae which are barely separated; with the usual covering of stiff bristles.

*Legs*. 1243. Width of first patella at "knee" .368 mm., tibial index of first leg 9. Width of fourth patella at "knee" .325 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.575	1.170	3.055	2.892	1.137	11.829
2.	2.762	1.170	2.210	2.600	1.040	9.782
3.	2.015	.812	1.040	1.235	.715	5.817
4.	2.600	1.137	1.722	2.210	.788	8.454
Palp	.596	.260	.238	—	.823	1.917

First coxa with the usual well developed ventral distal retrolateral hook and the dorsal tubercle; the prolateral groove and ridge on the second femur well developed.

*Spines*. First leg: femur dorsal 0-0-1-1-1, prolateral 0-0-2-1-1, retrolateral 0-0-0-1-1, ventral a single series of five on retromargin 0-0-1-1-1-0-1; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1; tibia dorsal 0-1-1-1-0, prolateral 0-1-0-1-0, retrolateral 0-1-0-1-1, ventral 2-lp-lp-lp-2; metatarsus dorsal 0-1-1-0, prolateral 0, retrolateral 0-1-1-0, ventral 2-2(irregular)-

lp-0. Second leg: femur dorsal as in first, prolateral and retrolateral 0-0-0-1-1, ventral with a double series, five along retromargin and two on promargin in distal quarter; patella as in first; tibia dorsal 0-1-1-1-0, prolateral 0-1-0-1-1, retrolateral 0-0-1-1-1, ventral lp-lp-lp-lp-2 (Fig. 51); metatarsus dorsal 0-1-1-0, prolateral 0, retrolateral 0-1-1-0, ventral 0-2-lp-0. Third leg: femur dorsal as in first, prolateral and retrolateral only one near distal end, ventral only two on retromargin in distal third; patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral 1-1-1, retrolateral 0-0-1-1, ventral lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral and retrolateral 0-1-0, ventral 1-1-1-1. Fourth leg: femur dorsal as in first, prolateral and retrolateral apparently only one near distal end, ventral four on retromargin in distal two thirds and three on promargin in distal half (Fig. 52); patella as in third; tibia dorsal 0-1-1-1-0, prolateral 1-1-1-1, retrolateral 1-1-1, ventral 2-lp-lp-2; metatarsus dorsal 0-1-1-0, prolateral 0-1-1-0, retrolateral 0-0-1-1-0, ventral 0-1-1-1.

*Palp.* Complicated; basal femoral tubercle or ridge opposing maxillary tooth moderately well developed; patella short with a weak proximal dorsal spine and a long slender distal dorsal spine as usual; tibia also short, trilobed, and with the usual chitinized rim or collar on the articular lobe together with a less conspicuous dorsal rim. Tarsus: the basal apophysis is a distorted arrowhead shape; the clavis is robust and projects ventrally more than usual in the genus; the uncus is a somewhat twisted spine lying in a depression in the conductor largely made by a small marginal lobe of the latter; the conductor is relatively large, with a small marginal lobe somewhat like that of *E. scutigera* and two characteristic anterior surfaces both of which are finely setose and with the smaller surface somewhat concave; the vesicle is moderately large; the embolus is of moderate length, relatively broad and flat; the terminal laminae are only moderately wrinkled and striated but are concave and massive contiguous to the conductor (Figs. 53-54).

*Abdomen.* 3.12 mm. long; 2.275 mm. wide about one-third from base where it is widest; with the usual supply of long slender spinules; other observed features appear to be typical of the genus.

*Color in alcohol.* Carapace shows no dots but the paratypes show that these may be present in certain individuals; when present they appear as a transverse row of four at level of middle of thoracic groove; the holotype shows a large pale brownish spot on each side at anterior end of thoracic groove and this appears to be more or less constant among the paratypes; the area behind LE is flecked with gray. Sternum yellowish with gray flecks around the margin. Legs are yellowish with broad brownish rings together with pale and darker spots. Abdomen: the dorsal folium is well developed; the venter has the usual darker area between genital groove and base of spinnerets containing a central granular oval white spot but the white mark is variable among the paratypes.

*Type locality.* The holotype is from Barro Colorado Island, C. Z., August, 1936. Six paratype males have been found in my collections from the following localities: Barro Colorado Island, August, 1936; July-August, 1939; July, 1950; Summit, C. Z., July, 1950; Boquete, R. P., August, 1950.

#### EUSTALA EXIGUA sp. nov.

(Figures 55-58)

*Male holotype.* Total length 3.315 mm. Carapace 1.69 mm. long; 1.386 mm. wide opposite interval between second and third coxae where it is widest; with shape typical of the genus; with a moderately well developed coat of light and dark hair; with numerous long slender spines in ocular area and two pairs of spinules just in front of the well developed median longitudinal thoracic groove; .638 mm. tall opposite third coxae and, therefore, about .46 as tall as wide.

*Eyes.* Eight in two rows, all dark. Viewed from above, posterior row gently recurved; viewed from in front, anterior row straight. Anterior row nearly as wide as posterior row. Ratio of eyes AME : ALE : PME : PLE = 12 : 8.5 : 9 : 7.5. AME separated from one another by their diameter, from ALE by three-fourths of their diameter. PME separated from one another by five-sixths of their diameter, from PLE by about five-halves of their diameter. Laterals separated from one another by one-third of the diameter of PLE. Central ocular quadrangle



wider in front than behind in ratio of 4 : 3, only slightly wider in front than long. Height of clypeus equal to a little less than three-fourths of the diameter of AME.

*Chelicerae*. Moderately robust; essentially parallel; basal segment .55 mm. long; with a moderately well developed basal boss. Promargin of fang groove with four teeth; retromargin with four small teeth, one of which is minute (teeth determined from a paratype to avoid injury to the holotype). With well developed scopulae.

*Maxillae*. Slightly convergent; normal to the genus; with the tubercle well developed in opposition to the palpal femoral ridge.

*Lip*. Wider than long in ratio of 13 : 8; maxillae extend beyond lip to a distance equal to three-fourths of its length. Sternal suture moderately procurved.

*Sternum*. Scutiform; moderately convex; widest between second coxae; longer than wide in ratio of 31 : 29; sternum proper not extended between fourth coxae but a narrow sclerite continues posteriorly between fourth coxae which are separated by about one-third of their width.

*Legs*. 1243. Width of first patella at "knee" .249 mm., tibial index of first leg 8. Width of fourth patella at "knee" .206 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.530	.836	2.222	1.936	.792	8.316
2.	1.760	.660	1.430	1.606	.660	6.116
3.	1.166	.396	.638	.726	.440	3.366
4.	1.716	.616	1.188	1.364	.550	5.434
Palp	.352	.132	.154	—	.594	1.232

*Spines*. First leg: femur dorsal 0-1-1-0-1-1, prolateral 0-1-1-1-1, retrolateral 0-0-0-0-1-1, ventral a double series with two on promargin and four on retromargin and all near middle; patella dorsal 1(weak)-1, prolateral and retrolateral 1-1; tibia dorsal 0-1-0-1-0 on right and 0-1-0-1-1-0 on left, prolateral 0-1-0-1-1, retrolateral 0-1-1-0, ventral 2-2-2 with irregularities between right and left; metatarsus dorsal 1-1-0-0, prolateral 0, retrolateral 0-1-1-0, ventral 0-2-0-0. Second leg: femur dorsal essentially as in first, prolateral only one near distal end, retrolateral 0-0-0-1-1, ventral with no true spines on promargin but with an



irregular series of five on retromargin and stiff bristles which suggest additional reduced spines; patella dorsal as in first, prolateral 1-0, retrolateral 1-1; tibia dorsal 1-1-1-0, prolateral 1-1-1-0-1, retrolateral 0-1-1-0, ventral 0-0-1-2 (Fig. 55); metatarsus dorsal 1-1-1-0-0, prolateral 0, retrolateral 0-1-1-0, ventral 0-2-0-0. Third leg: femur dorsal 0-1-1-1, prolateral and retrolateral only one near distal end, ventral with four robust spines on left and five on right and more or less medial in position; patella only dorsal 1-1; tibia dorsal 0-1-0-1-0, prolateral 0, retrolateral 0-1-1, ventral 0-lp-2; metatarsus dorsal 1-0-0, prolateral and retrolateral 0-1-0, ventral 0-lp-2. Fourth leg: femur dorsal 0-1-1-1, prolateral and retrolateral only one near distal end, ventral a double series of eleven on left and seven on right, irregularly placed (Fig. 56); patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 1-1-1-0, prolateral 0-1-1-1, retrolateral 0-1-1, ventral 0-0-lp-2; metatarsus dorsal 1-1-0, prolateral 0-1-1-1, retrolateral 0, ventral 0-0-2. Numerous variations of spination have been noted among the paratypes and even from side to side in the holotype. Palp: patella dorsal 1 (weak)-1 (long, slender); tibia with numerous bristles some of which might be considered slender spines; tarsus with numerous stiff bristles. First coxa with the usual hook at the distal retrolateral corner. Second femur with the usual chitinized ridge and groove on the prolateral side.

*Palp.* Trochanter with a low, relatively large, chitinous tubercle; femur with a basal curved chitinous ridge; patella with a single long dorsal distal spine. The tibia is trilobate as follows: dorsal lobe triangular with a ruffled chitinized anterior margin; the body has a ventral chitinized rim and a strongly chitinized prolateral tubercle; the retrolateral lobe is rounded and less chitinized. Tarsus: the basal apophysis is a strongly chitinized, modified arrow-shaped structure; the clavis is somewhat excavated at its base and is moderately robust; the uncus is a relatively long slender spine which appears distally bifid; the conductor is relatively large, with an excavated distal border, and has two slender apophyses extending from its median rim; the vesicle is large for so small an organ and has an unusual terminal position; the embolus is broad at its base and tapers to a point after passing around the vesicle in an unusual manner; the

terminal laminae show a pair of low grooves distally placed (Figs. 57-58).

*Abdomen.* Total length 1.885 mm.; with the usual rounded triangular form; longer than wide in ratio of about 5 : 2; with the usual supply of long slender spines; with other features essentially typical of the genus.

*Color in alcohol.* As usual the color pattern in this species is highly variable and, as commonly used, of little value in determination of the species. The holotype has a well defined dorsal folium with a hexagonal dark spot at its anterior end but the folium itself is highly variable in the different available specimens and sometimes almost lacking. The median anterior dark spot seems to be the most persistent part of the folium. There is a transverse row of four small dots across the carapace near the posterior end of the thoracic groove and a dark spot of irregular shape on each side of the pars cephalica with a white spot between. The holotype has a ventral triangular dark spot with its apex at the base of the spinnerets without the usual central white spot but the latter appears in some paratypes. The sternum is yellowish with dark marginal flecks.

*Type locality.* Male holotype from Barro Colorado Island, C. Z., July, 1939. Numerous male paratypes from the following localities: Barro Colorado Island, July-August, 1936; July-August, 1939; June-July, 1950; Ft. Sherman, C. Z., August, 1939; Canal Zone Forest Reserve, C. Z., August, 1936 and July-August, 1939; El Valle, R. P., July, 1936; Arraijan, R. P., July, 1950.

#### EUSTALA FRAGILIS (O. P. Cambridge), 1889

*Epeira fragilis* O. P. Cambridge, 1889

*E. fragilis* Keyserling, 1892

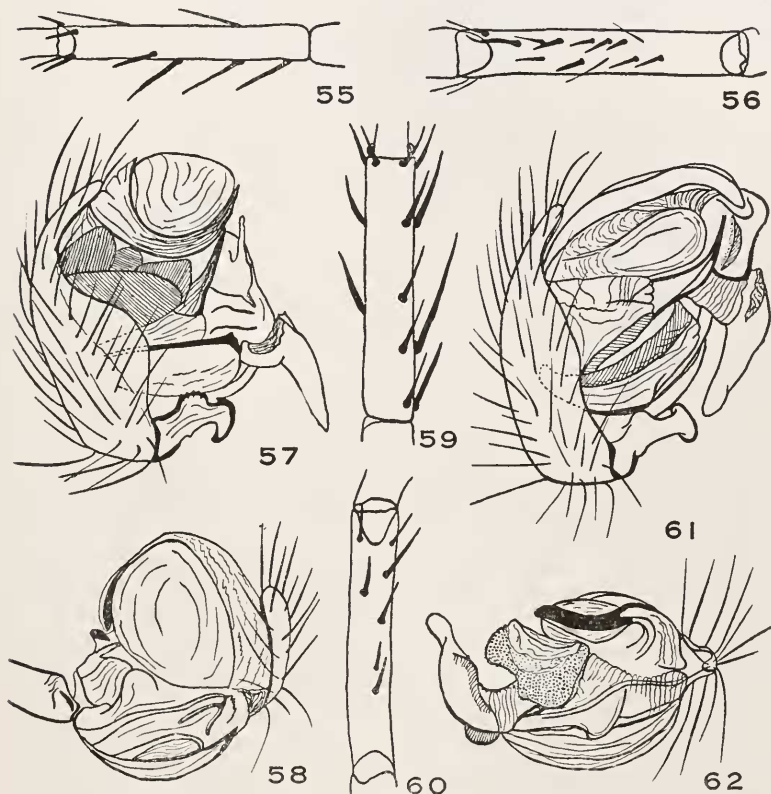
*Eustala fragilis* F. P. Cambridge, 1904

*E. fragilis* Petrunkevitch, 1911

*E. fragilis* Petrunkevitch, 1925

The Cambridges had this species from Guatemala and Panama but the British Museum (Natural History) was unable to loan me any representative. Until recently I have regarded the species treated in this paper as *E. minima* sp. nov. as *E. fragilis* (O. P. Cambridge) but at the present time I am unable to do this. I am also unable to work out any clear understanding of

the species from published statements concerning it. I am, therefore, compelled to omit the species from the keys and to leave its



External Anatomy of *Eustala*  
 Figures 55-58, *E. exigua* sp. nov.  
 Figures 59-62, *E. gertschi* sp. nov.

- Fig. 55. Left second tibia from below.  
 Fig. 56. Left fourth femur from below.  
 Fig. 57. Left male palpal tarsus, lateral view.  
 Fig. 58. Left male palpal tarsus from in front.  
 Fig. 59. Right second tibia from below.  
 Fig. 60. Left fourth femur from below.  
 Fig. 61. Left male palpal tarsus, lateral view.  
 Fig. 62. Left male palpal tarsus from in front.

proper treatment until a more thorough understanding of it is obtained.

EUSTALA GERTSCHI sp. nov.

(Figures 59-62)

*Male holotype.* Total length 4.452 mm. Carapace 2.405 mm. long; 1.950 mm. wide opposite interval between second and third coxae where it is widest; .845 mm. tall and, therefore, about .43 as tall as wide; gently inclined from PME to beginning of steep posterior declivity; median longitudinal thoracic groove well developed; with a distinct but low convexity between AME and PME from which two long slender spines extend; with a well developed coat of whitish procumbent hair extended into a distinct tuft dorsal and posterior to LE.

*Eyes.* As usual, eight in two rows, all dark; LE on moderately prominent tubercles; viewed from above, posterior row distinctly recurved; viewed from in front and measured by centers, anterior row gently procurved; central ocular quadrangle only slightly wider in front than behind and only slightly longer than wide in front. Ratio of eyes AME : ALE : PME : PLE = 12 : 8 : 10 : 8. AME separated from one another by nine-eighths of their diameter, from ALE by five-thirds of their diameter. PME separated from one another by seven-fifths of their diameter, from PLE by seven-halves of their diameter. Laterals separated from one another by one-half of their diameter. Height of clypeus equal to three-halves of the diameter of AME.

*Chelicerae.* Basal segment .596 mm. long. Fang groove well defined; promargin with the usual four teeth and retromargin with three but these seem smaller and less clearly defined than usual (observed on a paratype to avoid injury to the holotype). Otherwise typical in all observed features.

*Maxillae.* As usual in the genus in all observed features including the maxillary tooth used in opposition to the palpal femoral ridge.

*Lip.* Wider than long in ratio of 35 : 22; moderately grooved and striated in basal third. Sternal suture definitely procurved.

*Sternum.* Scutiform; longer than wide in ratio of about 9 : 7; a narrow sclerite continues between fourth coxae which are

separated by about one-seventh of their width; moderately convex; markedly scalloped opposite all coxae except the fourth and with narrow sclerites continuing between all coxae.

*Legs.* 1243. Width of first patella at "knee" .347 mm., tibial index of first leg 12. Width of fourth patella at "knee" .314 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.535	1.040	1.885	1.852	.942	8.254
2.	2.015	.910	1.657	1.787	.845	7.214
3.	1.495	.528	.770	.924	.594	4.311
4.	2.080	.910	1.560	1.848	.814	7.212
Palp	.425	.220	.180	—	.946	1.771

First coxa with the usual ventral hook and dorsal tubercle, both well developed; ridge and groove on second femur also well developed as usual.

*Spines.* First leg: femur dorsal 0-0-1-1-1, prolateral 0-0-1-1 (both robust)-1 on right and 0-0-1-1-1-1 on left, retrolateral 0-0-0-1-1, ventral 0; patella dorsal 1(weak)-1, prolateral 0-1-0, retrolateral 0-1-1; tibia dorsal 0-1-1-1-0, prolateral and retrolateral 0-1-0-1-0, ventral lp-lp-lp-lp-2; metatarsus dorsal 1-0-1-0, prolateral 0, retrolateral 0-1-0-0, ventral 0-2-2-lr-0. Second leg: femur dorsal as in first, prolateral and retrolateral 0-0-0-1-1, ventral 0; patella as in first except prolateral 0-1-1; tibia dorsal 0-1-1-1-0, prolateral 1-1-0-1-1, retrolateral 0-1-1-1, ventral lp-lp-lp-lp-2 (Fig. 59); metatarsus dorsal 0-1-0, prolateral 0, retrolateral 0-1-1-0, ventral 0-2-2-lp. Third leg: femur dorsal 0-1-0-1, prolateral and retrolateral only one near distal end, ventral three on retromargin; patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 0-1-0-1-0, prolateral 1-1-1, retrolateral 0-1-1, ventral lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-0-1, retrolateral 0-1-0, ventral 0-1-0-1. Fourth leg: femur dorsal 0-1-0-1-1, prolateral and retrolateral only one near distal end, ventral two on promargin in distal fourth and five on retromargin in distal two-thirds of segment (Fig. 60); patella as in third; tibia dorsal 0-1-1-1-0, prolateral 1-1-0-1-0, retrolateral 0-1-1, ventral lp-2-lp-2; metatarsus dorsal 1-1-0-1-0, prolateral 0-1-0-1-1, retrolateral 0, ventral lp-lp-0-lp-lp.

*Palp.* Complicated; femur, patella and tibia all apparently

typical of the genus. Tarsus: basal apophysis well developed as usual but its distal end is simply bent and knobbed, not a distorted arrow-head as is typically the case; the clavis is moderately robust and somewhat excavated at its base and also has a characteristic ridge and groove on the anterior surface of the proximal part of the free portion; the uncus is very long, slender, curved, and apparently finely divided at its distal end; the conductor is large and quadrilateral in outline as usually viewed; there is also a fold and a depression on the ventral surface of the conductor contiguous to the tip of the uncus which gives the appearance of a distinct lobe in one of the paratypes; the anterior end of the conductor is differentiated into an extensive setose surface and a small smooth portion; in one paratype the anterior surface of the conductor shows a shallow depression; the vesicle is rather smaller than average but definite and in its usual position; the embolus is long and somewhat sinuous, robust and somewhat flattened; the terminal laminae show a prominent elevation contiguous to the conductor and a large blunt tubercle (Figs. 61-62).

*Abdomen.* Rather oval in outline; 2.470 mm. long; 2.242 mm. wide; somewhat flattened dorsoventrally; with the usual supply of dorsal and dorsolateral long slender spinules. With other observed features typical of the genus.

*Color in alcohol.* Carapace: ocular area yellowish; remainder of pars cephalica brownish; lateral sides of pars thoracica brown with dorsal parts lighter and mottled. Sternum grayish with white subchitinous granular spots. Legs: all femora dark brown dorsally, lighter beneath; other segments yellowish with brownish spots. Abdomen: with a moderately well developed narrow dorsal folium; white or grayish from subchitinous granules elsewhere dorsally, dorsolaterally and laterally; venter with the usual dark central area containing a small central white spot. The paratype collected by Dr. Gertsch is without a folium and is much lighter throughout.

*Type locality.* Male holotype from Barro Colorado Island, C. Z., June, 1950. Two male paratypes from the same locality; February, 1936 (Gertsch) and June, 1948 (Schneirla).

EUSTALA GUTTATA F. P. Cambridge, 1904  
(Figures 63-68)

*E. guttata* Petrunkevitch, 1911



*E. guttata* Petrunkevitch, 1925

*E. guttata* Banks, 1929 (female but not male)

I have found it difficult to identify the males of this species. The two male specimens on loan from the British Museum (Natural History) differ considerably from one another. I have chosen as my standard the one which agrees most fully with F. P. Cambridge's description and figures. I have also included in the species as now recognized a few males which appear to be deviates from the typical. The females appear to be endowed with characters sufficiently distinctive to make their identification relatively simple.

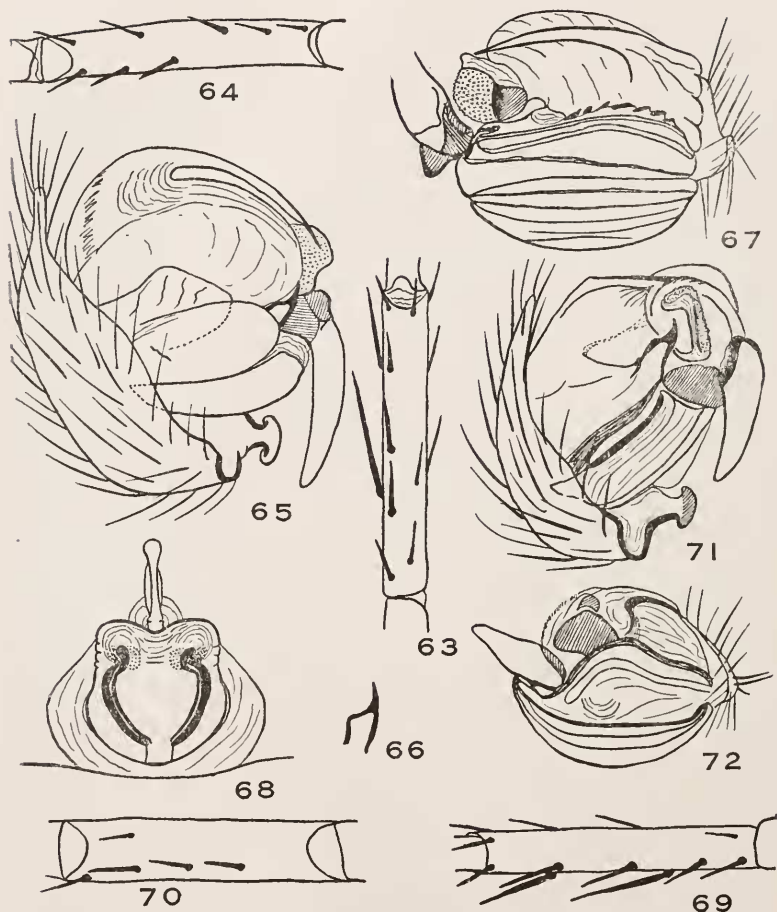
*Male hypotype.* Total length 4.225 mm. With the usual round triangular form of the body. Central ocular quadrangle wider in front than behind in ratio of about 4 : 3, wider in front than long in ratio of about 6 : 5. Ratio of eyes AME : ALE : PME : PLE = 13 : 8 : 10 : 8. AME separated from one another by about three-halves of their diameter, from ALE by nearly five-thirds of their diameter. PME separated from one another by slightly more than their diameter, from PLE by nearly four diameters. Laterals separated from one another by five-eighths of their diameter. Two long slender spines just posterior to LE and a row of four similar spines between ME. Height of clypeus equal to slightly more than the diameter of AME. Secondary sexual characters on maxillae, first coxae, and second femur as usual.

*Legs.* 1243. Width of first patella at "knee" .303 mm., tibial index of first leg 8. Width of fourth patella at "knee" .271 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.445	.910	2.730	2.340	.975	10.400
2.	2.470	.780	1.787	1.885	.910	7.832
3.	1.625	.585	.910	.942	.747	4.809
4.	2.405	.780	1.560	1.755	.780	7.280
Palp	.379	.271	.195	—	.780	1.625

Spines are largely removed from the hypotype through handling and long preservation. However, the following records are probably fairly accurate: the first femur appears to have two ventral spines on the promargin and one on the retromargin





External Anatomy of *Eustala*

Figures 63-68, *E. guttata*

Figures 69-72, *E. inconstans* sp. nov.

- Fig. 63. Left second tibia of male from below.  
 Fig. 64. Right fourth femur of male from below.  
 Fig. 65. Left male palpal tarsus, lateral view.  
 Fig. 66. Uncus of the same, somewhat enlarged.  
 Fig. 67. Left male palpal tarsus from in front.  
 Fig. 68. Epigynum from below.  
 Fig. 69. Left tibia from below.  
 Fig. 70. Right fourth femur from below.  
 Fig. 71. Left male palpal tarsus, lateral view.  
 Fig. 72. Left male palpal tarsus from in front.

near the distal end; the second femur appears to have only one ventral spine on the promargin near distal end; ventral and related spines on the second tibia are shown in Figure 63; the third femur has a definite double series of ventral spines with three or four on each margin; the ventral spines of the fourth femur are shown in Figure 64.

*Palp.* Features of femur, patella, and tibia appear to be typical of the genus. Tarsus: the basal apophysis essentially as usual; clavis, somewhat damaged, but appears to be moderately robust with small articular surfaces at its base; the uncus is a pointed hook with a distinct shoulder at its base; the conductor is smaller proportionately than in many species and has a moderately setose shallow excavation on its distal surface together with two other more or less distinctive surfaces; the terminal laminae show a series of strongly chitinized ridges; the embolus is moderately long and slender (Figs. 65-67).

*Female hypotype.* Total length 5.525 mm. Body form like that of male.

*Legs.* 1243. Width of first patella at "knee" .379 mm., tibial index of first leg 10. Width of fourth patella at "knee" .357 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.575	1.202	2.795	2.260	.975	10.607
2.	2.990	1.170	2.307	1.950	.942	9.359
3.	1.755	.715	1.040	1.040	.682	5.232
4.	2.860	1.105	1.820	1.820	.780	8.385

First femur with a pair of ventral spines near distal end; the remaining femora apparently lacking the ventral spines.

*Epigynum.* Pattern of spermathecae, tubules, and apertures much as in *E. scutigera* and some other species; the most distinctive features appear to be the expanded auricular regions at base of scape on each side (Fig. 68).

*Color in alcohol.* The hypotype male is discolored from long preservation. The more recently collected males and females show a highly variable color pattern the more persistent features of which appear to be the following: a well developed dorsal folium which is itself highly variable in color; a transverse row of four small brownish dots across the carapace at about the

middle of the thoracic groove and a transverse row of two similar spots at the base of pars cephalica; with a ventral elongated whitish spot in the center of a dark area between the genital groove and spinnerets.

*Type locality.* Male hypotype from San Jose, Costa Rica (Tristan); probably collected a few years before 1909. Female hypotype from Barro Colorado Island, C. Z., July, 1950. In the various collections which I have had the opportunity of studying, I have seen what I consider to be this species from many localities in Mexico, Guatemala, Honduras, and Panama.

EUSTALA INCONSTANS sp. nov.

(Figures 69-72)

*Male holotype.* Total length 4.485 mm. Carapace 2.210 mm. long; 1.852 mm. wide opposite interval between second and third coxae where it is widest; .910 mm. tall and, therefore, about .49 as tall as wide; gently inclined from PME to beginning of steep posterior declivity opposite interval between second and third coxae; with well developed median longitudinal thoracic groove; with spines confined to ocular area; apparently with a rather sparse covering of procumbent, light colored hair; without definite tufts of hair behind PLE but with a group of eight to ten bristles or spinules in this position.

*Eyes.* As usual, eight in two rows, all dark; LE on moderately prominent tubercles. Viewed from above, posterior row strongly recurved; viewed from in front, anterior row gently procurved, measured by centers. Central ocular quadrangle wider in front than behind in ratio of about 5 : 4; wider in front than long in ratio of nearly 9 : 8. Ratio of eyes AME : ALE : PME : PLE = 11 : 8 : 9.5 : 7.5. AME separated from one another by three-halves of their diameter, from ALE by nearly five-thirds of their diameter. PME separated from one another by slightly more than their diameter, from PLE by about seven halves of their diameter. Laterals separated from one another by three-fifths of the diameter of PLE. Height of clypeus equal to slightly more than the diameter of AME.

*Chelicerae.* Basal segment .55 mm. long; transversely rugulose on anterior surface. Fang groove well defined; promargin and

retromargin appear to have the usual complement of teeth but inspection is impossible without serious injury to holotype. Otherwise typical of the genus in all observed features.

*Maxillae.* Apparently as usual in all observed features including the maxillary tooth used in opposition to the femoral palpal ridge.

*Lip.* Wider than long in ratio of about 3 : 2; cross striated in basal half. Sternal suture definitely procurved.

*Sternum.* Scutiform; longer than wide in ratio of 11 : 8; not definitely continued between fourth coxae which are separated by about one-fifth of their width; with the usual supply of long stiff bristles or spinules.

*Legs.* 1243. Width of first patella at "knee" .314 mm., tibial index of first leg 9. Width of fourth patella at "knee" .271 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.925	1.072	2.340	2.210	.942	9.489
2.	2.405	.942	1.755	1.885	.780	7.767
3.	1.495	.520	.747	.780	.552	4.094
4.	1.900	.877	1.300	1.667	.760	6.504
Palp	.347	.227	.162	—	.942	1.678

Ventral hook on first coxa typical of the genus; dorsal tubercle on first coxa poorly indicated; prolateral basal ridge and groove on second femur well developed.

*Spines.* First leg: femur dorsal 0-0-1-1-1, prolateral the same with the first two long and robust, retrolateral 0-0-0-1-1, ventral promargin 0-0-1-0-1, retromargin 0-0-0-1-1; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1; tibia dorsal 0-1-0-1-0, prolateral and retrolateral 0-1-0-1-1, ventral 2-lp-2 (irregular)-0-2; metatarsus dorsal 0-1-0-1-0, prolateral 0, retrolateral 0-1-0-1-0, ventral 2-2(irregular)-lp-0. Second leg: femur dorsal and retrolateral as in first, prolateral 0-0-0-1-1, ventral promargin only one near distal end and retromargin 0-0-1-0-0; patella as in first; tibia dorsal 0-1-0-1-1-0, prolateral 0-1-1-1, retrolateral 0-1-1-0, ventral 2-lp-lp-lp-2 (Fig. 69); metatarsus dorsal 0-1-0-0-0, prolateral 0-1-0, retrolateral 0-1-0-0, ventral

lr-lp-lr-lp-lr-0. Third leg: femur dorsal 0-1-1-1, prolateral and retrolateral only one near distal end, ventral 0; patella 1(weak)-1, prolateral and retrolateral 0-1-0; tibia dorsal 1-0-1-0, prolateral and retrolateral 0-1-1, ventral lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral and retrolateral 0-1-0, ventral lp-lp-lp. Fourth leg: femur as in third except ventral as shown in Figure 70; patella as in third; tibia dorsal 0-1-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-1, ventral 2-lp-lp-2; metatarsus dorsal 0-1-1-0, prolateral 0-1-0-1-1, retrolateral 0-1-0-1-0, ventral 0-lp-0-1.

*Palp.* Complicated; basal femoral ridge, patella, and tibia essentially typical of the genus. Tarsus: basal apophysis a distorted arrow-head shape distally as usual; the clavis is moderately robust and somewhat excavated at its base; the uncus is of moderate length and a robust and twisted hook; the conductor is relatively small, moderately concave on its anterior surface where it is finely setose; the vesicle is apparently withdrawn to the interior and is nearly invisible externally; the embolus is short and appears sharply pointed when viewed in the ordinary way, and is very distinctive in appearance; the terminal laminae are massive, with a large tubercle close to the base of the clavis (Figs. 71-72).

*Abdomen.* Total length 2.470 mm.; 1.852 mm. wide about one-fourth from base; with the usual round-triangular form; with the usual supply of long, slender, dorsal, and dorsolateral spinules. Other observed features typical of the genus.

*Color in alcohol.* Carapace unicolorous yellowish except for faint dots as they occur in so many species of the genus; probably here in two rows of two and four as described in *E. guttata*. The sternum is a pale yellow throughout. The legs are yellowish with faint indications of the usual brown bars, rings, and spots which would show more or less clearly in many other members of the species. Abdomen: the dorsal folium barely indicated; general color of dorsum and lateral sides whitish from the presence of many subchitinous white granules; the venter is yellowish white without distinctive markings.

*Type locality.* The holotype is from Barro Colorado Island, C. Z., June, 1950. There are no paratypes.

## EUSTALA INGENUA sp. nov.

(Figure 73)

*Female holotype.* Total length 4.745 mm. Carapace 2.080 mm. long; 1.885 mm. wide opposite second coxae where it is widest; .780 mm. tall and, therefore, about .41 as tall as wide; median thoracic groove well defined; with what appears to be only a sparse coat of light colored procumbent hair.

*Eyes.* Eight in two rows, all dark; viewed from above, posterior row strongly recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 28 : 25, slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 8 : 6.5 : 8 : 6.5. AME separated from one another by seven-fourths of their diameter, from ALE by nearly three times their diameter. PME separated from one another by nearly 1.5 times their diameter, from PLE by four times their diameter. Laterals separated from one another by ten-thirteenths of their diameter. Height of clypeus equal to about three-fourths of the diameter of AME.

*Chelicerae.* Basal segment .675 mm. long; general features typical of the genus. Fang groove with four promarginal and three retromarginal teeth as usual.

*Maxillae.* Appear to be completely typical of the genus in all observed features.

*Lip.* Wider than long in ratio of about 4 : 3; reaches slightly beyond the middle of the maxillae. Sternal suture distinctly procurved and with anterolateral angles of sternum produced into distinct tubercles.

*Sternum.* Scutiform; longer than wide in ratio of 8 : 7; bluntly pointed at posterior end which is not continued between fourth coxae which are separated by about one-sixth of their width; with low convexities opposite all coxae; with the usual stiff bristles (spinules).

*Legs.* 1243. Width of first patella at "knee" .3141 mm., tibial index of first leg 11. Width of fourth patella at "knee" .2708 mm., tibial index of fourth leg 13.



	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.470	1.040	1.936	1.760	.758	7.964
2.	2.275	.990	1.755	1.625	.747	7.392
3.	1.365	.575	.704	.747	.520	3.911
4.	2.080	.836	1.325	1.495	.585	6.321

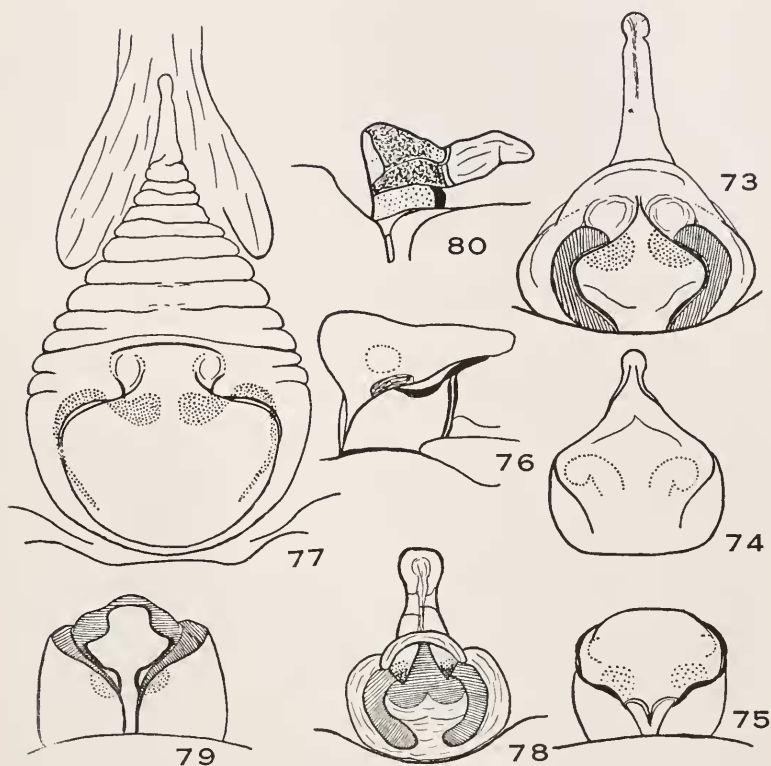
*Spines.* First leg: femur dorsal 0-0-1-0-1, prolateral 0-0-1-1-1 (first two long and robust), retrolateral 0-0-0-0-1-1, ventral only one near distal end on both promargin and retromargin; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1; tibia dorsal 1-1-1-0, prolateral and retrolateral 0-1-1-1, ventral 2-lp-2-0-2; metatarsus dorsal 0-1-1-0-0, prolateral 0; retrolateral 0-1-1-0, ventral lr-2-lp-0 on left and 2-2-lp-0 on right. Second leg: femur as in first except that the two corresponding to the two large prolaterals are small; patella as in first; tibia essentially as in first; metatarsus as in first except ventral lr-lp-lr-lp-0-0. Third leg: femur dorsal 0-1-1-0-1, prolateral and retrolateral only one near distal end, ventral 0 but several spinules suggest normal spines; patella probably only dorsal 1-1; tibia dorsal 1-0, prolateral 0, retrolateral 0-1, ventral lp-lp-2; metatarsus dorsal 0-1-1-0-0, prolateral 0-1-0-0, retrolateral 0, ventral lp-lp-1-1. Fourth leg: femur as in first except ventral one on retromargin near distal end; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0-1; tibia dorsal 1-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-0-1, ventral lp-lp-lp-2; metatarsus dorsal 0-1-1-0-0, prolateral 0-1-1-1, retrolateral 0-1-1-0, ventral 0-lp-lp-0-1.

*Abdomen.* 3.25 mm. long; 2.73 mm. wide about one-fourth from base where it is widest; with numerous long slender spines; other features essentially typical of the genus.

*Epigynum.* Quite distinctive; with a relatively long and slender scape which arises abruptly from the base which is considerably wider than long; the apertures are separated by less than the diameter of one of them (Fig. 73). The base is not extended; hence it seems unnecessary to include a figure drawn from the lateral aspect.

*Color in alcohol.* Both of the available specimens of this species agree well in coloration. Carapace yellowish with poorly defined light reddish brown streaks passing from anterior end of the thoracic groove to the ocular region. Sternum yellowish. Legs:





External Anatomy of *Eustala*  
 Figure 73, *E. ingenua* sp. nov.  
 Figures 74-76, *E. innoxia* sp. nov.  
 Figure 77, *E. lata* sp. nov.  
 Figures 78-80, *E. latebricola*

- Fig. 73. Epigynum from below.  
 Fig. 74. Epigynum from below.  
 Fig. 75. Epigynum, a more posterior view.  
 Fig. 76. Epigynum, lateral view.  
 Fig. 77. Epigynum from below.  
 Fig. 78. Epigynum from below.  
 Fig. 79. Epigynum, a more posterior view.  
 Fig. 80. Epigynum, a lateral view.

different shades of amber yellow. Abdomen: dorsal and dorso-lateral regions yellowish white from many subchitinous granules; venter yellowish and also with many subchitinous whitish granules; just posterior to the genital groove there is a poorly defined elongated whitish spot.

*Type locality.* Holotype and one paratype female are from Summit, C. Z., July, 1950.

EUSTALA INNOXIA sp. nov.

(Figures 74-76)

*Female holotype.* Total length 5.135 mm. Carapace 2.015 mm. long; 1.592 mm. wide opposite interval between second and third coxae where it is widest; .780 mm. tall and, therefore, about .49 as tall as wide; median longitudinal thoracic groove well defined but apparently not as pronounced as in the more typical members of the genus; with a moderately well developed coat of yellowish hair raised into a rather poorly developed tuft accompanied by bristles just posterior to PLE; with two long slender spinules centrally placed behind PME and further behind these a short distance anterior to the thoracic groove are probably six similar spines in two rows of three each.

*Eyes.* Eight in two rows, all dark as usual; viewed from above, posterior row moderately recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of about 11 : 10, as long as wide in front. Ratio of eyes AME : ALE : PME : PLE = 11 : 9 : 10 : 7.5. AME separated from one another by their diameter, from ALE by about four-thirds of their diameter. PME separated from one another by nine-tenths of their diameter, from PLE by slightly less than three times their diameter. Laterals separated from one another by two-thirds of the diameter of PLE. Height of clypeus equal to seven-elevenths of the diameter of AME.

*Chelicerae.* Basal segment .780 mm. long; fang groove well developed and with four retromarginal and three promarginal teeth as usual. Other observed features typical of the genus.

*Maxillae.* Appear to be completely typical of the genus in all observed features.

*Lip.* Wider than long in ratio of nearly 4 : 3; gently grooved and cross striated in basal third. Sternal suture distinctly procurved; with no marked anterolateral sternal tubercles at ends of the suture.

*Sternum.* Scutiform; only slightly longer than wide; not continued between fourth coxae which are separated by about one-fifth of their width; with only slight convexities opposite each coxa; probably in life with the usual supply of long stiff bristles (spinules).

*Legs.* 1243. Width of first patella at "knee" .2816 mm., tibial index of first leg 8. Width of fourth patella at "knee" .2599 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.315	1.007	2.665	2.405	1.040	10.432
2.	2.600	.900	1.950	1.950	.910	8.310
3.	1.540	.572	.836	.996	.650	4.594
4.	2.535	.836	1.386	1.694	.770	7.221

*Spines.* First leg: femur dorsal 0-1-1-0-0-1, prolateral 0-0-1-1-1-1, retrolateral only one near distal end, ventral probably none but some might regard spinules present as weak spines and worth recording; patella dorsal 1(weak)-1, prolateral 0-1-0, retrolateral 1-1; tibia dorsal 0-1-0-1-1-0, prolateral 0-1-0-1-1, retrolateral 0-1-1-0, ventral lp-0-lr-lp-0-lr; metatarsus dorsal 0-1-1-0-0, prolateral 0, retrolateral 0-1-1-0, ventral 0-lr-0-0. Second leg: femur dorsal as in first, prolateral and retrolateral only one near distal end, ventral 0; patella dorsal as in first, prolateral 0, retrolateral as in first on right but on left 0-1; tibia dorsal and retrolateral as in first, prolateral 0-1-0-1-0, ventral (only bristle)-2-lr; metatarsus dorsal 0-1-1-0, prolateral 0-1-0-0, retrolateral 0-1-1-0, ventral only bristles. Third leg: femur dorsal 0-1-0-0-1, prolateral and retrolateral only one near distal end, ventral only bristles or spinules; patella only dorsal 1-1; tibia dorsal 1-0-1-0, prolateral 0, retrolateral 0, ventral lp-lp-2; metatarsus dorsal 0-1-1-0-0, prolateral and retrolateral 0, ventral 0-lp-lp. Fourth leg: femur dorsal 0-1-0-1-1(last one duplicated on left), prolateral and retrolateral only one near distal end, ventral two on retromargin near distal end; patella dorsal and prolateral as in third, retrolateral 0-1; tibia dorsal

0-1-0-1, prolateral 0-1-1-1, retrolateral 0-0-1-1-1-1, ventral lr-0-lr; metatarsus dorsal 0-1-0-0, prolateral and retrolateral 0-1-0, ventral 0.

*Abdomen.* 3.120 mm. long; 3.445 mm. wide near middle; tall as well as broad and, therefore, not of the usual *Eustala* form; with numerous slender spines of moderate length; other features appear to be fairly typical of the genus.

*Epigynum.* Simple as compared to the typical organ in the genus; the scape is short and broadly attached to the base which is relatively massive; apertures hidden (Figs. 74-76).

*Color in alcohol.* Carapace: yellowish with a black dot on each side at base of pars cephalica and on a line with the LE; also with a few faint irregular grayish spots on the pars cephalica. Sternum: yellowish with faint grayish spots opposite the coxae. Legs: yellowish with a few grayish spots. Abdomen: the dorsal folium moderately well outlined in posterior half; most of the dorsal and dorsolateral areas are white from many subchitinous granules; there is also a narrow dark transverse wavy line just in front of the middle; the venter is generally yellowish with scattered white subchitinous granules; a few dark subchitinous spots occur irregularly in the anterior third of the venter; there is an incomplete dark ring around the spinnerets and an accumulation of white granules in the center behind the genital groove make a poorly outlined central white spot.

*Type locality.* The holotype and one female paratype are from the Canal Zone Forest Reserve, C. Z., August, 1939.

#### EUSTALA LATA sp. nov.

(Figure 77)

This specimen had recently moulted when taken and is somewhat fragile but is in fair condition.

*Female holotype.* Total length 8.255 mm. Carapace 3.640 mm. long; 3.380 mm. wide opposite interval between second and third coxae where it is widest; 1.170 mm. tall and, therefore, about .35 as tall as wide; median longitudinal thoracic groove well defined as usual; with a well developed coat of yellowish procumbent hair and numerous brownish spinules over much of the surface and with tufts of the hair behind PLE.

*Eyes.* Eight in two rows, all dark as usual; viewed from above, posterior row rather strongly recurved; viewed from in front, anterior row definitely procurved; central ocular quadrangle wider in front than behind in ratio of 46 : 41, wider in front than long in about the same ratio. Ratio of eyes AME : ALE : PME : PLE = 11 : 9 : 10 : 10. AME separated from one another by nearly three diameters of one of them, from ALE by about four diameters of one of them. PME separated from one another by 2.5 times their diameter, from PLE by a little more than seven times their diameter. Laterals separated from one another by eleven-ninths of the diameter of ALE. Height of clypeus equal to a little less than twice the diameter of AME.

*Chelicerae.* Basal segment 1.365 mm. long; fang groove well developed; promargin with four teeth and only the last one is noticeably smaller; retromargin with four fairly robust teeth (one of the rare instances in the genus); other observed features appear to be typical of the genus.

*Maxillae.* Appear to be typical of the genus in all observed features.

*Lip.* Wider than long in ratio of 5 : 4; gently grooved and cross striated in basal third. Sternal suture distinctly procurved.

*Sternum.* Scutiform; longer than wide in ratio of about 3 : 2; anterolateral corners produced into distinct tubercles at ends of sternal suture; posterior end bifurcated and not continued between fourth coxae which are separated by about one-fifth of their width; with the usual supply of longer and shorter stiff spinules.

*Legs.* 1243. Width of first patella at "knee" .5848 mm., tibial index of first leg 10. Width of fourth patella at "knee" .5957 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.420	1.950	3.850	3.705	1.495	15.320
2.	4.030	1.950	3.250	3.510	1.495	14.235
3.	2.600	1.235	1.452	1.755	1.040	8.082
4.	3.850	1.885	2.860	3.120	1.250	12.965

*Spines.* First leg: femur dorsal 0-0-1-0-1, prolateral 0-0-1-1-0-1 on right and 0-0-1-1-1-0-1 on left, retrolateral 0-0-0-0-1-1, ventral three along promargin all in distal half and only one on retro-

margin near distal end but a row of spinules along retromargin suggests suppressed spines; patella dorsal 1-1, prolateral and retrolateral 1-1-0; tibia dorsal 0-1-1-1-0, prolateral 0-1-0-0-1, retrolateral 0-1-0-1-1, ventral 2-lp-2-0-2; metatarsus dorsal 0-1-1-0, prolateral 0-0-1-1, retrolateral 0-1-1-0, ventral 2-2-0-lr-0. Second leg: femur dorsal as in first, prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1, ventral only one definite spine on retromargin near distal end but there is a row of eight or nine spinules before this: patella as in first; tibia dorsal as in first, prolateral and retrolateral 0-1-1-1, ventral 2-lp-2-lr-2; metatarsus dorsal 0-1-1-0, prolateral and retrolateral essentially like dorsal, ventral 2-lp-lr-lp-lr-lp. Third leg: femur dorsal 0-1-0-1-1, prolateral 0-0-0-1-1, retrolateral only one near distal end, ventral apparently 0; patella dorsal as in first, prolateral 0-1-0, retrolateral 0-0-1; tibia dorsal 1-0-1-0, prolateral 0-0-1-1, retrolateral 0-0-1, ventral apparently lp-lp-2; metatarsus dorsal 0-1-1-0, prolateral 0-1-1, retrolateral 0, ventral lp-lp-2-lp. Fourth leg: femur dorsal essentially as in third, prolateral and retrolateral only one near distal end, ventral only one on retromargin near distal end; patella as in third; tibia dorsal 1-1-1-0, prolateral 0-1-0-1-1, retrolateral 0-1-1, ventral 2?-0-lp-lp-2; metatarsus dorsal 0-1-1-0, prolateral 0-1-1-1, retrolateral 0-1-1-0, ventral lp-lp-lp-lp. Tarsal claws as usual in the genus. Palpal claw pectinate in a single row of eight teeth; the distal two robust, others very slender.

*Abdomen.* 5.01 mm. long; 4.420 mm. wide about one-third from base; with the usual round-triangular form; with many slender spines of moderate length; without the long spines which often occur in *Eustala*; other features appear to be typical of the genus, except that two small posterior tubercles suggest a potential bifid condition.

*Epigynum.* Nearly twice as long as wide at base of scape; scape gradually narrowed to tip; tubules form an oval area at base; apertures small and nearly two diameters apart; unextended so as to be only partly visible in profile (Fig. 77).

*Color in alcohol.* Holotype recently moulted and normal color probably not well established. Cephalothorax, legs, and mouth parts light yellowish; four small dark spots faintly outlining a square in middle of dorsal area; legs with indications of large dark spots on many segments. Abdomen: dorsum whitish with



small reddish dots and a mixture of grayish and greenish streaks; with a fairly well defined folium; venter with a large black median spot enclosing a white spot of irregular shape.

*Type locality.* Holotype from Barro Colorado Island, C. Z., August, 1950. No paratypes have appeared in my collection.

# EUSTALA LATEBRICOLA (O. P. Cambridge), 1889

(Figures 78-80)

*Epeira latebricola* O. P. Cambridge, 1889

*E. latebricola* Keyserling, 1892

*Eustala latebricola* F. P. Cambridge, 1904

*E. bifida* Banks, 1909 (in part)

*E. latebricola* Petrunkevitch, 1911

*E. latebricola* Petrunkevitch, 1925

*Female hypotype.* Total length 4.875 mm. With the body form ordinarily described as round-triangular; with what appears to be nearly suppressed shoulder humps. The central ocular quadrangle as wide behind as in front; wider than long in ratio of 10 : 9. Ratio of eyes AME : ALE : PME : PLE = 9 : 8 : 9 : 7. AME separated from one another by five-thirds of their diameter, from ALE by eight-thirds of their diameter. PME separated from one another by about 1.5 of their diameter, from PLE by about four times their diameter. Laterals separated by three-fourths of the diameter of ALE. Height of clypeus slightly greater than the diameter of AME. Promargin of fang groove with four teeth, the second and fourth smaller; retromargin with three teeth.

*Legs.* 1243. Width of first patella at "knee" .3249 mm., tibial index of first leg 9. Width of fourth patella at "knee" .325 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.990	1.105	2.405	1.950	.975	9.425
2.	2.470	1.040	1.950	1.755	.845	8.060
3.	1.527	.617	.758	.812	.585	4.299
4.	2.405	.975	1.430	1.462	.715	6.987

The hypotype seems to lack ventral femoral spines but some specimens have a pair of ventral spines on the first and last

femora near the distal end.

*Epigynum.* Quite distinctive; the scape is bluntly rounded at the distal end and somewhat constricted in the middle; there is a groove and a ridge, semicircular in shape, at the base of the scape; the base itself is very prominent in the middle as seen in posterior view (Figs. 78-80).

*Color in alcohol.* The general color pattern is, as usual, exceedingly variable; the folium is often well developed but it may be almost completely lacking; the transverse row of four small dots across the carapace at the level of the posterior third of the thoracic groove and the transverse row of two dots at the base of the pars cephalica are present in the hypotype but are sometimes reduced in number or lacking altogether; the elongated white spot in the center of a dark area on the venter is usually present.

*Type locality.* The Cambridges had this species from Guatemala and Panama. The hypotype is from Boquete, R. P., August, 1950. In addition to the single female sent from the British Museum I have several females from Boquete, R. P., July, 1939 and August, 1950. Numerous specimens labelled *E. bifida* Cb. and, presumably, reported by Banks (1909) as *E. bifida* are in reality *E. latebricola* (O. P. Cambridge).

#### EUSTALA LONGEMBOLA sp. nov.

(Figures 81-85)

*Male holotype.* Total length 4.29 mm. Carapace 2.210 mm. long, 1.885 mm. wide between intervals separating second and third coxae where it is widest; .845 mm. tall and, therefore, about .45 as tall as wide; rises gradually from PME to opposite interval between second and third coxae from where it descends to posterior margin; with a well developed longitudinal thoracic groove; with a few weak spines and a sparse coating of procumbent brown hair.

*Eyes.* Eight in two rows, all dark; LE on moderately prominent tubercles; viewed from above both rows of eyes strongly recurved; viewed from in front, anterior row somewhat procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 35 : 28; wider in front than long in ratio of 35 : 32. Ratio of eyes AME : ALE : PME : PLE =

11 : 7 : 9 : 7. AME separated from one another by about fourteen-elevenths of their diameter, from ALE by eighteen-elevenths of their diameter. PME separated from one another by four-thirds of their diameter, from PLE by nearly five times their diameter. Laterals separated from one another by four-sevenths of their diameter. Clypeus very receding. Height of clypeus equal to slightly more than the diameter of AME.

*Chelicerae.* Essentially parallel, but distal half is somewhat excurved; with moderately well developed basal boss; basal segment .617 mm. long, and somewhat cross striated in front. Fang groove well defined; promargin with four teeth, fourth somewhat isolated from others; retromargin with three teeth of moderate size. Fang evenly curved as usual.

*Maxillae.* In general as in male of *E. mexicana* in all observed features.

*Lip.* Wider than long in ratio of about 7 : 5; extends only a little beyond middle of maxillae; basal half somewhat cross striated. Sternal suture moderately procurved.

*Sternum.* Scutiform; longer than wide in ratio of 19 : 16; a sclerite continues from posterior end between fourth coxae which are almost in contact; covered with long curved bristles.

*Legs.* 1243. Width of first patella at "knee" .3249 mm., tibial index of first leg 8. Width of fourth patella at "knee" .2708 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.445	1.137	2.730	2.210	.910	10.432
2.	2.600	.942	1.820	1.885	.910	8.157
3.	1.495	.585	.845	.845	.585	4.355
4.	2.210	.910	1.560	1.625	.715	7.020
Palp	.412	.217	.162	—	.780	1.571

First coxa with a well developed ventral distal retromarginal hook; prolateral groove at base of second femur also well developed; dorsal tubercle on first coxa moderately well developed.

*Spines.* First leg: femur dorsal 0-0-1-1-1, prolateral and retrolateral the same, ventral apparently 0-lp-0-0-2 (considerable variation has been noted among paratypes); patella dorsal 1-1, prolateral 0-1-0, retrolateral 0-0-1-0; tibia dorsal 0-1-0-1-1-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-2-2-lp-2 with some

irregularities between right and left; metatarsus dorsal 0-1-1-0, prolateral 0-1-0-1-0, retrolateral 0-1-1-0, ventral lr-lr-0-0. Second leg: femur as in first except ventral spines apparently consist of only a pair near distal end; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1-0; tibia dorsal 0-1-1-1-0; prolateral and retrolateral 0-1-1-0, ventral 2-lp-2-lp-2 (Fig. 81); metatarsus dorsal 0-1-0, prolateral 0, retrolateral 0-1-1-0, ventral lr-lp-lr-lp-0. Third leg: femur dorsal 0-1-1-1, prolateral and retrolateral 0-0-1, ventral 0-lp-lp-0; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0-0-1-0; tibia dorsal 0-1-0-1-0, prolateral 0-1-0, retrolateral 0-1-1, ventral 0-lr-lr-lr; metatarsus dorsal 0-1-0-0, prolateral 0-1-1, retrolateral 0-1-0, ventral lr-lr-lr. Fourth leg: femur essentially as in third except ventral with nine on right as in Figure 82 or six on left; patella essentially as in third; tibia dorsal 0-1-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-1, ventral 2-lp-lp-2; metatarsus dorsal 0-1-0-1-0, prolateral 0-1-1-0, retrolateral 0-0-1-1-0, ventral 0-lp-0-lp.

*Palp.* Complicated; basal femoral tubercle or ridge opposing the maxillary tooth well developed; the patella is short, with a weak basal dorsal spine and a long slender distal dorsal spine; the patella also has a well developed distal retrolateral tubercle which is assumed to act in opposition to one of the other nearby chitinized structures; the tibia has the characteristic tri-lobed structure with each lobe well developed. Tarsus: the basal tarsal apophysis only slightly distorted from an arrow-shape; the clavis is rather slender, not excavated basally; the uncus is sharply pointed with a well developed shoulder at its base; the conductor is relatively simple, with an excavation on its distal face; the vesicle is large, nearly as extensive as the embolus; the embolus is long, slender, and curves along the whole distal border; the terminal laminae are only moderately grooved but they are provided with a series of thin strongly chitinized raised surfaces (Figs. 83-85).

*Abdomen.* Total length 2.405 mm.; rounded at both ends, with obscure triangular form; longer than wide in ratio of 37 : 27; with the usual long slender dorsolateral and dorsal spines; with other features as usual in the genus.

*Color in alcohol.* Carapace yellowish with a brownish dot on each side near posterior end of the thoracic groove and another

similar dot on each side near the anterior end of the groove; there are indications also of more or less extensive irregular brownish spots including much of the anterior half; these latter markings are conspicuous in some paratypes but lacking in others; the dots appear to be quite consistent in the paratypes. Sternum: yellowish with only faint blotches of gray around the margin. Mouth parts mostly yellowish but brownish flecks may occur. Legs: with many brownish rings, bars, and spots. Abdomen: dorsal folium narrow in front, with a narrow brown margin around posterior two-thirds; venter with a somewhat irregular quadrilateral spot between genital groove and base of spinnerets bearing a small central white spot. These ventral markings show variations among paratypes but seem to be fundamentally quite persistent.

*Type locality.* Holotype male from Barro Colorado Island, C. Z., August, 1939. Male paratypes from the following localities: Barro Colorado Island, C. Z., June-July, 1934; June-August, 1936; July-August, 1939; June-August, 1950; Arraijan, R. P., August, 1950; C. Z. Forest Reserve, C. Z., August, 1936 and July-August, 1939; Ft. Sherman, C. Z., August, 1939; El Valle, R. P., July, 1936; Madden Dam Forest, C. Z., August, 1939 and July, 1950; C. Z. Experiment Station, Summit, C. Z., July-August, 1950; near Chiva, C. Z., August, 1950; Chilibre, C. Z., July, 1950; Variedades, Guatemala, August, 1947 (C. and P. Vaurie).

#### EUSTALA MAXIMA sp. nov.

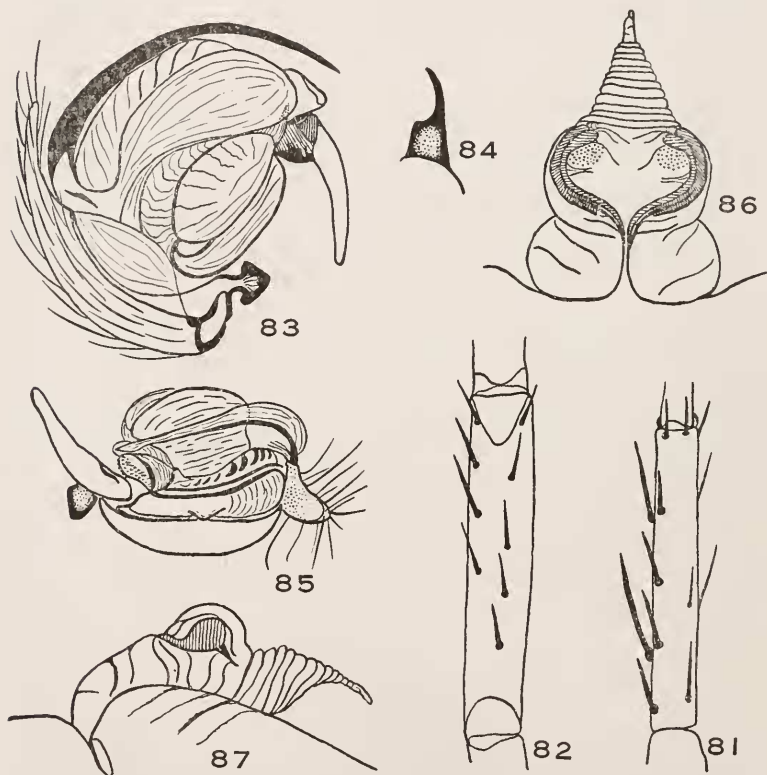
(Figures 86-87)

This is the species which has been repeatedly identified as *E. bifida* F. P. Cambridge. I am now convinced that it is distinct from the latter and inclined to believe that it is the female of *M. banksi* sp. nov. but there can be no certainty at present.

*Female holotype.* With the usual round-triangular form; total length 10.34 mm. Carapace 3.64 mm. long; 3.12 mm. wide opposite interval between second and third coxae where it is widest; 1.30 mm. tall and, therefore, about .42 as tall as wide; with median longitudinal thoracic groove well developed; with few if any spines except in ocular region; with a well developed coat

of almost white procumbent hair.

*Eyes.* Eight in two rows as usual, all dark; viewed from above, both rows strongly recurved; viewed from in front, anterior row moderately procurved, measured by centers; central ocular



External Anatomy of *Eustala*

Figures 81-85, *E. longembola*

Figures 86-87, *E. maxima*

- Fig. 81. Left second tibia from below.
- Fig. 82. Right fourth femur from below.
- Fig. 83. Tarsus of male palp, lateral view.
- Fig. 84. Uncus of the same somewhat enlarged.
- Fig. 85. Tarsus of male palp, from distal end.
- Fig. 86. Epigynum, from below.
- Fig. 87. Epigynum, lateral view.



quadrangle exactly as wide in front as behind, slightly longer than wide. Ratio of eyes AME : ALE : PME : PLE = 12 : 9 : 13 : 10. AME separated from one another by slightly less than twice their diameter, from ALE by slightly more than four times their diameter. PME separated from one another by about 1.5 times their diameter, from PLE by nearly 5.5 times their diameter. Laterals separated from one another by a little more than two-thirds of the diameter of ALE. Height of the clypeus equal to the diameter of AME. A transverse row of four spinules extends between the rows of ME midway. Ventral border of clypeus with the usual row of stiff bristles.

*Chelicerae*. Moderately robust; essentially parallel; front surface with many slender spines. Basal segment 1.43 mm. long; with moderately well developed basal boss. Promargin of fang groove with four teeth, the fourth the smallest; retromargin with four teeth, all close together, the second the smallest; the fang is fairly robust, evenly curved, finely dentate along inner margin; the fang groove is well defined and finely dentate.

*Maxillae*. With all usual features well developed. There appears to be a somewhat suppressed maxillary tooth corresponding to the strongly chitinized tooth on all males.

*Lip*. Wider than long in ratio of about 31 : 24; transversely striated in basal two-fifths; bluntly pointed distally; reaches only slightly beyond middle of maxillae. Sternal suture distinctly procurved with distal lateral corners of the sternum extended forward.

*Sternum*. Scutiform; longer than wide in ratio of 3 : 2; continued between fourth coxae by a slender sclerite; with fourth coxae separated from one another by a little more than one-fourth of their width; with slight convexities opposite first, second, and third coxae.

*Legs*. 1243. Width of first patella at "knee" .5957 mm., tibial index of first leg 11. Width of fourth patella at "knee" .6065 mm., tibial index of fourth leg 14.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.640	1.950	3.380	3.380	1.397	13.747
2.	3.445	1.820	2.990	3.120	1.300	12.675
3.	2.340	1.105	1.300	1.625	.975	7.345
4.	3.380	1.690	2.535	2.860	1.170	11.635

*Spines.* First leg: femur dorsal 0-1-0-1-1, prolateral and retrolateral the same, ventral spines weak but probably with three or four on each margin and all in distal half; patella dorsal 1-1, prolateral and retrolateral 0-1-1-0; tibia dorsal 0-1-1-1-0, prolateral and retrolateral 0-1-0-1-1(weak), ventral 2-lp-lr-lp-0-2; metatarsus dorsal 0-1-0-1-0, prolateral 0-1-1-0, retrolateral 0-0-1-0-1-0, ventral 2-2-2-0 with some irregularity. Second leg: essentially the same as the first with few exceptions. Third leg: femur essentially as in first and second; patella dorsal 0-1-0-1, prolateral 0-1-0, retrolateral 0; tibia dorsal 1-0-1-0, prolateral 1-1-1(first and last weak), retrolateral 0, ventral lp-lp-2; metatarsus dorsal 1-0-1-0, prolateral 1-0-1-0(both weak), retrolateral 0, ventral lp-lp-lp-2. Fourth leg: with few exceptions like third but differences seem unimportant. Palpal spines: femur dorsal 0-1-0-1; patella dorsal 1-1; tibia with several spines and numerous spinules; tarsus also with numerous spines and spinules. Palpal claw: pectinate in a single row of six or seven slender teeth. Tarsal claws three; proclaw with five or six teeth, retroclaw with eight slender teeth.

*Abdomen.* 6.50 mm. long; as wide as long; low convexities suggest suppressed shoulder humps; the posterior end is quite distinctly bifid dorsoventrally much like that of *E. bifida*. Otherwise essentially typical of the genus.

*Epigynum.* Bears a close resemblance to that of *E. bifida* F. P. Cambridge but there are clearly defined differences best shown in figures (Figs. 86-87).

*Color in alcohol.* Carapace yellowish, flecked with brown; with signs of dots and stripes as described for the male of *E. banksi* sp. nov. Legs yellowish with brown spots and broad irregular rings. Sternum yellowish with many subchitinous granules and a brownish margin. Abdomen: with a poorly defined dorsal folium; dorsum nearly white from the presence of many subchitinous yellowish-white granules; the venter has a somewhat quadrilateral dark area between the genital groove and the base of the spinnerets; a central elongated white granular spot extends through anterior half of the dark area.

*Type locality.* Holotype female from Summit, C. Z., July, 1950. Female paratypes from Barro Colorado Island, C. Z., July (Dodge); also from the Rau collection with no date.

EUSTALA MEXICANA sp. nov.  
(Figures 88-89)

*Female holotype.* With the conventional round-triangular form; total length 5.20 mm. Carapace 2.08 mm. long, 1.80 mm. wide opposite interval between second and third coxae where it is widest; .65 mm. tall and, therefore, about .36 as tall as wide; with a well developed longitudinal thoracic groove; with a pair of slender spines at anterior end of thoracic groove and several other similar spines on cephalic part; also with a moderately well developed coat of light yellowish procumbent hair.

*Eyes.* Eight in two rows as usual, all dark; none particularly prominent; viewed from above both rows strongly recurved; viewed from in front, anterior row moderately procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 15 : 13, wider in front than long in ratio of about 15 : 13. Ratio of eyes AME : ALE : PME : PLE = 9 : 7 : 8.75 : 6.5. AME separated from one another by a little less than two diameters, from ALE by a little less than three diameters of AME. PME separated from one another by nearly one and one-third of their diameter, from PLE by four diameters of PME. Laterals separated by slightly more than one-half the diameter of ALE. Height of clypeus equal to about two-thirds of the diameter of AME. Ventral border of clypeus with a row of stiff bristles.

*Chelicerae.* Moderately robust, parallel; medially the anterior surface with numerous converging spine-like bristles. Basal segment .78 mm. long; with well developed basal boss. Promargin of fang groove with four teeth, second and fourth small, others moderately robust; retromargin with three moderately robust teeth, all in basal half. Fang moderately robust and evenly curved.

*Maxillae.* Essentially parallel; robust; with well developed scopula along medial border and inner distal corner; with well developed serrula along outer distal corner and adjacent distal and lateral surfaces.

*Lip.* Wider than long in ratio of about 4 : 3; broad distal border very full and well rounded; transversely excavated in basal two-thirds; reaches only slightly beyond middle of maxillae. Sternal suture distinctly procurved.

*Sternum.* Scutiform; only slightly longer than wide; slightly the widest between second coxae; not extended between fourth coxae which are separated by about one-fourth of their width; with moderately developed prominences opposite coxae.

*Legs.* 1243. Width of first patella at "knee" .3249 mm., tibial index of first leg 10. Width of second patella at "knee" .3141 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.055	1.040	2.340	1.690	.715	8.840
2.	2.405	.970	1.755	1.495	.747	7.372
3.	1.365	.650	.780	.715	.552	4.062
4.	2.275	.970	1.462	1.300	.650	6.657

*Spines.* First leg: femur dorsal 0-1-0-1-1, prolateral 0-1-1-1-0, retrolateral 0-0-0-1-1, ventral 0-0-1-0-1 on prolateral margin and one near distal end on retromargin; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1; tibia dorsal 0-1-1-1-0, prolateral and retrolateral 0-1-0-1-1(weak), ventral 2-lp-2-lp; metatarsus dorsal 0-1-0-1-0-0, prolateral apparently 0, retrolateral 0-1-0-1-0, ventral 1r-2-lp-0. Second leg: femur dorsal and retrolateral as in first, prolateral 0-0-0-1-1-1(weak), ventral apparently only one weak spine near distal end on retromargin; patella as in first; tibia as in first except ventral 1r-2-lp-1r-0; otherwise essentially as in first. Third leg: femur dorsal 0-1-0-1, prolateral and retrolateral apparently only one definite spine on each at distal end, ventral 0; patella only dorsal 1-1, and prolateral 0-1-0; tibia dorsal 1r-lp, prolateral 0, retrolateral only one weak distal spine, ventral 1p-lp-2; metatarsus dorsal 1p-lr, prolateral 0-1-0, retrolateral apparently 0, ventral 1p-lp-lp-lp (all weak and little more than bristles). Fourth leg: femur dorsal 0-1-0-1-1, ventral only one distal on retrolateral margin; patella retrolateral 0-0-1-0, elsewhere as in third; tibia dorsal 1-1-1, prolateral 1-1-0-1-1, retrolateral 0-1-1, ventral 1p-lp-lp-lp; metatarsus dorsal 1-1-0, prolateral 1-1-1, retrolateral 0-0-1(weak), ventral 0-1-1-1. Palpal spines: femur dorsal 0-1; patella dorsal 1-1, prolateral 0-1; tibia dorsal 0-1-0, prolateral 1-1, retrolateral 0-1 (weak), ventral 0; tarsus with numerous spines irregularly placed. Palpal claws: pectinate in a single row of about six or seven light colored teeth and difficult to distinguish clearly. Three tarsal claws as usual in the genus.

*Abdomen.* Round-triangular, viewed dorsally; shoulder humps barely distinguishable; with a slightly developed tubercle at posterior end; longer than wide between suppressed shoulder humps in ratio of about 7 : 6; with numerous moderately long slender spines. Otherwise as usual in the genus.

*Epigynum.* With a broad base and slender scape; difficult to describe but quite distinctive; apertures about two diameters apart (Figs. 88-89).

*Color in alcohol.* Carapace: light yellowish with poorly defined brownish radiations from the thoracic groove; dark pigment surrounds the eyes. Sternum: with a fairly broad brownish margin; yellowish elsewhere. Mouth parts yellowish, streaked with gray. Legs and palps yellowish with brownish bands. Abdomen: dorsal folium well marked, highly variegated; dorsolaterally are four yellowish spots on each side; the venter has a large median quadrilateral brownish spot between the genital groove and base of spinnerets; the brownish spot is nearly divided by a narrow white stripe and is bounded laterally on each side by a narrow, somewhat incurved stripe.

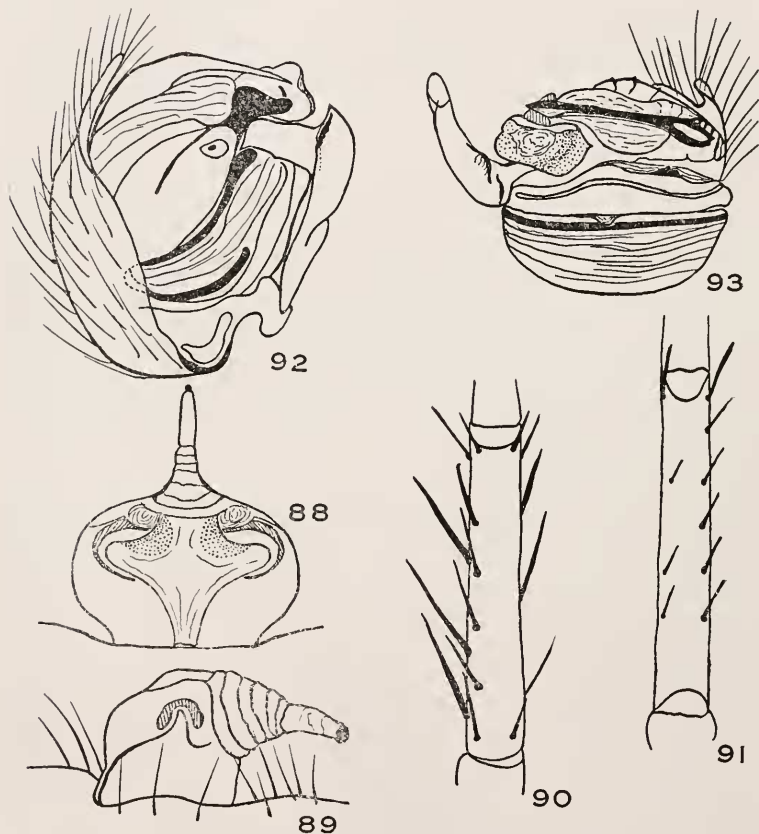
*Type locality.* Holotype female from Lo Bajo, Guerrero, Mexico, June, 1941 (L. I. Davis). Female paratypes from the following localities in Mexico: Boca de Pasquales, Colima, January, 1943 (F. Bonet); Chiapas, Rio de los Flores, near Cintalpa, September, 1947; Conjumatlan, Michoacan, June, 1941 (A. M. Davis); Hidalgo, Ixmiquilpan, August, 1947 (H. Wagner); Huajuapán, Oaxaca, Sept.-Oct., 1946 (H. Wagner); Nayerit, San Blas, August, 1947 (C. and M. Goodnight); Oaxaca, Tehuantepec, January, 1948 (T. MacDougal); Nayerit, Tepic, Sept., 1947 (B. Malkin); Teotitlán, Oaxaca, Sept., 1944 (H. Wagner); Tamaulipas, Santa Gracia, July, 1940 (Rau); Vera Cruz, Vera Cruz, July, 1946 (H. Wagner).

EUSTALA MIMICA sp. nov.

(Figures 90-93)

All three specimens available to me for this study are in rather poor condition. The one chosen for the holotype has an injured and detached abdomen but is otherwise in good condition.

*Male holotype.* Total length about 7.48 mm. Carapace 4.225 mm. long; 3.185 mm. wide opposite interval between second and third coxae where it is widest; 1.365 mm. tall and, therefore,



External Anatomy of *Eustala*

Figures 88-89, *E. mexicana*

Figures 90-93, *E. mimica*

- Fig. 88. Epigynum from below.
- Fig. 89. Epigynum, lateral view.
- Fig. 90. Left second tibia from below.
- Fig. 91. Left fourth femur from below.
- Fig. 92. Tarsus of male palp, lateral view.
- Fig. 93. Tarsus of male palp from distal end.



about .43 as tall as wide; rises gradually from PME to highest point opposite interval between second and third coxae from where it slopes rather abruptly to posterior border; well rounded along margin from posterior border to opposite anterior border of third coxae and then with little change to opposite anterior border of second coxae from where it narrows to a blunt point in region of AME; longitudinal thoracic groove well marked with considerable convexity on each side; with two long slender spinules midway between AME and PME and two similar spinules on each side above LE.

*Eyes.* Eight in two rows, all dark; ocular tubercle bearing LE moderately prominent; viewed from above, both rows strongly recurved; viewed from in front, anterior row moderately procurved; central ocular quadrangle wider in front than behind in ratio of 8 : 7, nearly as wide in front as long. Ratio of eyes AME : ALE : PME : PLE = 9 : 5 : 7 : 5. AME separated from one another by nearly their diameter, from ALE by about five-thirds of their diameter. PME separated from one another by nine-sevenths of their diameter, from PLE by about three and one-half times their diameter. Laterals separated from one another by three-fifths of their diameter. Height of clypeus equal to eleven-ninths of the diameter of AME.

*Chelicerae.* With basal boss moderately well developed; basal segment 1.11 mm. long; each with numerous long slender spinules in front medially directed and overlapping; fang groove well marked, with four promarginal teeth the most distal of which is merely a dentule and with three retromarginal teeth of moderate size.

*Maxillae.* Essentially parallel; with the usual robust lateral tubercle opposed to the basal femoral palpal tubercle; other features as usual in the genus.

*Lip.* Wider than long in ratio of about 5 : 4. Sternal suture obscure but apparently gently procurved.

*Sternum.* Narrowly scutiform; mildly convex; moderately scalloped opposite coxae; longer than wide in ratio of 14 : 11; slightly widest at interval between second and third coxae but nearly as wide at interval between first and second coxae; posterior end continued as a very slender sclerite between fourth coxae which are separated by about one-fifth of their width.

*Legs.* 1243. Width of first patella at "knee" .585 mm., tibial index of first leg 9. Width of fourth patella at "knee" .520 mm., tibial index of fourth leg 10.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.550	2.015	4.355	4.160	1.625	16.705
2.	4.030	1.625	3.120	3.965	1.527	14.269
3.	3.250	1.105	1.625	1.755	1.000	8.735
4.	3.575	1.900	3.120	3.575	1.350	13.520
Palp	.550	.440	.308	—	1.298	2.596

*Spines.* First leg: femur dorsal 0-0-1-1-1, prolateral the same with slight irregularities, retrolateral 0-0-0-0-1-1, ventral apparently 0-0-0-0-lp-2; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1-0; tibia dorsal 0-1-1-1-0, prolateral and retrolateral 1-1-0-1-1 with some irregularities, ventral 2-lr-lp-2-lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-1-0-1, retrolateral 0-1-1-0, ventral 2-2-2-lp with some irregularity. Second leg: femur as in first except only a single ventral pair near distal end; patella as in first; tibia dorsal 0-1-1-1-0, prolateral 0-1-1-0-1-1 (long and robust), retrolateral 0-1-1-1-1, ventral 2-lp-lp-lp-lp-2 (Fig. 90); metatarsus dorsal 0-1-0-0-0, prolateral 0-0-1-0-1, retrolateral 0-1-1-0, ventral 2-2-2-lp. Third leg: femur dorsal 0-1-0-1-1, prolateral and retrolateral 0-0-0-1-1, ventral 0-1-2-lr-2-2 (with some irregularity); patella dorsal 1(weak)-1, prolateral 1-0, retrolateral 0-1; tibia dorsal 1-0-1-0, prolateral 1-1-1, retrolateral 0-1-1, ventral lp-2-2-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-1, retrolateral 0-1-0, ventral 2-2-2-lp. Fourth leg: femur dorsal 0-1-0-1-1, prolateral and retrolateral only one near distal end, ventral 0-2-2-lr-2-lr-2 (with some irregularity and differences on right and left) (Fig. 91); patella dorsal and retrolateral 0-1, prolateral 0-1-0; tibia dorsal 0-1-0-1-1-0, prolateral 1-1-1-1, retrolateral 1-1-1, ventral 2-2-2-2 (with some differences between right and left); metatarsus dorsal 0-1-1-0-0, prolateral 0-1-1-1, retrolateral 0-0-1-1-1, ventral 2-2-2-2. Tarsal claws apparently as usual in the genus. Trichobothria numerous and apparently widely distributed at least on tibiae and metatarsi.

*Palp.* Very complicated as usual in the genus. Maxillary tubercle, basal femoral tubercle, and probably trochanteral tubercle as usual in the genus. There is a single slender distal dorsal

spinule on the femur and a single long dorsal distal patellar spine. The patella is short, simple, strongly chitinized along its distal prolateral border; the tibia is very short but relatively broad with less well marked trilobate form than in many species and with the usual strongly chitinized ventral collar. Tarsus: basal apophysis a somewhat distorted arrow-shape; the clavis is robust, without basal excavation; the uncus is robust, with a relatively long robust shank and a marked shoulder at base of terminal hook; the conductor is comparatively simple on the ventral surface but is provided with several characteristic distal surfaces with no slender extensions; the vesicle is small, otherwise normal; the embolus is a slender, strongly chitinized tube terminating in a lance-like tip; the terminal laminae are simple with no strongly developed characteristic folds (Figs. 92-93).

*Abdomen.* Badly shrunk and so distorted as to make it undesirable to describe it. Apparently with the usual round-triangular form (shown clearly in paratypes); with many stiff spinules of the common kind.

*Color in alcohol.* Cephalothorax, legs, and mouth parts with various shades of yellowish without conspicuous markings. Holotype abdomen unsuitable for description. Paratype abdomens show a median dark stripe along cardiac region, a fairly well defined dorsal folium, many subchitinous whitish granules, a large ventral black area enclosing a white spot broadened in the middle.

*Type locality.* Male holotype from Summit, C. Z., December, 1946 (N. L. H. Krauss). Two male paratypes from the Phil Rau collection in the Museum of Comparative Zoology with no accompanying collection data but I think these were taken during the winter months on Barro Colorado Island, C. Z.

EUSTALA MINIMA sp. nov.

(Figures 94-96)

This species has hitherto been regarded as *E. fragilis* (O. P. Cambridge) but is now regarded as a species new to science. Unfortunately, *E. fragilis* was not included among the specimens loaned from the British Museum and, hence, it has been difficult to reach a decision in respect to the status of the species. How-

ever, a drawing kindly sent by Dr. G. Owen Evans has aided me in the final decision.

*Female holotype.* Of conventional, non-elongated, round-triangular form; total length 5.33 mm. Carapace 2.02 mm. long; 1.69 mm. wide opposite interval between second and third coxae where it is widest; .78 mm. tall and, therefore, about .46 as tall as wide; posterior declivity more precipitous than usual in the genus; median thoracic groove moderately well developed but relatively shorter than usual in the genus; with a group of several weak spines at anterior end of thoracic groove; with a transverse row of four slender spinules between ME; also with a moderately well developed coat of light colored procumbent hair.

*Eyes.* Eight in two rows, all dark; viewed from above, both rows moderately recurved; viewed from in front, anterior row slightly procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 28 : 25; longer than wide in front in ratio of 15 : 14. Ratio of eyes AME : ALE : PME : PLE = 11 : 8 : 8 : 8. AME separated from one another by slightly more than their diameter, from ALE by 15/11 of their diameter. PME separated from one another by their diameter, from PLE by 27/8 of their diameter. Laterals separated from one another by their radius. Height of clypeus equal to the diameter of AME.

*Chelicerae.* Basal segment .7 mm. long; general features as usual in the genus. Fang groove well defined and finely dentate; promargin with four teeth, second and fourth small, others of moderate size; retromargin with three teeth, the third the largest.

*Maxillae and Lip.* Typical of the genus in all observed features. Sternal suture procurved.

*Sternum.* Scutiform; almost exactly as wide as long; with only slight convexities at posterior end and opposite first, second, and third coxae; not continued between fourth coxae which are separated by a little less than one fifth of their width.

*Legs.* 1243. Width of first patella at "knee" .2924 mm., tibial index of first leg 9. Width of fourth patella at "knee" .2708 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.795	.977	2.307	2.210	.910	9.199
2.	2.370	.845	1.885	1.820	.700	7.620
3.	1.495	.600	.812	.866	.541	4.314
4.	2.340	.910	1.430	1.657	.650	6.987

*Spines.* First leg: femur dorsal irregular, 0-1-1-0-0-1 on right, 0-1-1-1-1-0-0-1 on left, prolateral 0-0-1-1-1-0, retrolateral apparently only one near distal end, ventral apparently only one weak spine on retromargin near distal end; patella dorsal 1-1, prolateral 1-0, retrolateral 1-1-1 on right, 1-1 on left; tibia dorsal 0-1-1-1-0, prolateral and retrolateral 0-1-1-1-1, ventral 0-lr-2-lp; metatarsus dorsal 0-1-0-0-0, prolateral 0-1-0, retrolateral 0-1-1-1-0, ventral 0-2-lr-0-0. Second leg: femur dorsal 0-1-1-0-0-1, prolateral and retrolateral apparently only one near distal end, ventral 0; patella dorsal 1 (weak)-1, prolateral 0-1 (weak)-0, retrolateral 0-1; tibia dorsal 0-1-1-1-0, prolateral and retrolateral 0-1-1-1, ventral 0-lr-2; metatarsus dorsal 0-1-1-0-0, prolateral apparently 0 but with several spinules, retrolateral 0-1-1-0, ventral 0-2-0-0. Third leg: femur dorsal 1-1 (weak)-1, retrolateral apparently only one near distal end; patella apparently only dorsal 1-1, tibia dorsal 1-1-0, ventral 1-1-2, elsewhere apparently 0; metatarsus dorsal 1-0-0, prolateral only one distal, retrolateral 1-0-0, ventral 0-lp-0-2. Fourth leg: essentially like the third with few exceptions which seem to be unimportant.

*Abdomen.* 3.25 mm. long; wider than long in ratio of 11 : 10. Other observed features are typical of the genus.

*Epigynum.* Viewed from a true ventral position, wider than long; with a short scape terminating in a bead-like expansion (Figs. 94-96).

*Color in alcohol.* Carapace yellowish with brownish dots and reddish flecks on cephalic part; the dots are arranged as a transverse row of four at about the beginning of the posterior declivity and another pair of dots also forming a transverse row in front of the thoracic groove. Sternum light yellow with a few brown flecks. The legs are yellowish with brownish spots and irregular reddish spots on the fourth tibiae and more distal segments. Abdomen: only the anterior end of a dorsal folium persists; most of the dorsum is covered with white subchitinous granules; there

is a paired series of small brown spots in the posterior half of the dorsum which I also regard as remains of the folium; the venter is light colored with white subchitinous granules. In common with other species, the paratypes show a high degree of color variations. In some the folium is well developed, and the legs have many brown spots, rings, and bars. The dots on the carapace appear to be fairly consistent in appearance. In some specimens the venter is dark colored. These facts are added evidence that no great importance can be attached to color patterns in this genus.

*Type locality.* The holotype female is from Barro Colorado Island, C. Z., June, 1950. Paratype females from the following localities have been studied: Mante, Mexico, August, 1943; Barro Colorado Island, C. Z., June-July, 1934; June-August, 1936; July-August, 1939; June, 1950; Ft. Randolph, C. Z., August, 1936; France Field, C. Z., August, 1939; Ft. Sherman, C. Z., August, 1939; C. Z. Forest Reserve, C. Z., July-August, 1939; Madden Dam, C. Z., August, 1939; Chilibre, C. Z., July, 1939; Boquete, R. P., July, 1939, August, 1950; El Valle, R. P., July, 1936; Arraijan, R. P., August, 1936; Porto Bello, R. P., August, 1936.

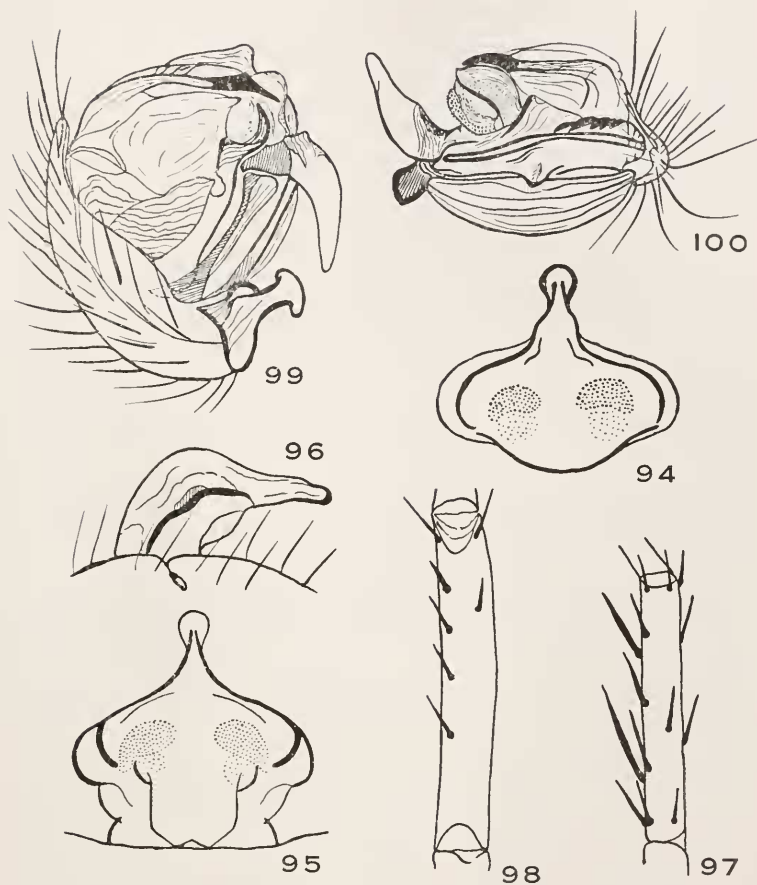
#### EUSTALA MONTANA sp. nov.

(Figures 97-100)

*Male holotype.* Total length 5.395 mm. Carapace 2.665 mm. long; 2.275 mm. wide between second and third coxae where it is widest; .845 mm. tall opposite interval between second and third coxae and, therefore, about .37 as tall as wide; gently inclined from PME to beginning of steep posterior declivity; with well defined median longitudinal thoracic groove; with spines confined to ocular area; covered with a well developed coat of brown and light colored procumbent hair and with a tuft of long white hairs just posterior to PLE.

*Eyes.* Eight in two rows as usual, all dark; LE on moderately prominent tubercles; viewed from above, posterior row strongly recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 19 : 16, wider in front than long in



External Anatomy of *Eustala*Figures 94-96, *E. minima*Figures 97-100, *E. montana*

- Fig. 94. Epigynum from below.  
 Fig. 95. Epigynum, a more posterior view.  
 Fig. 96. Epigynum, lateral view.  
 Fig. 97. Left second tibia from below.  
 Fig. 98. Right fourth femur from below.  
 Fig. 99. Tarsus of male palp, lateral view.  
 Fig. 100. Tarsus of male palp from distal end.

ratio of 19 : 17. Ratio of eyes AME : ALE : PME : PLE = 11 : 8.5 : 10 : 7.5. AME separated from one another by slightly more than twice their diameter, from ALE by nearly two and one-fourth times their diameter. PME separated from one another by 1.3 times their diameter, from PLE by 3.7 times their diameter. Laterals separated from one another by two-thirds the diameter of PLE. Height of clypeus equal to about 13/11 of the diameter of AME.

*Chelicerae*. Basal segment .814 mm. long. Fang groove well defined; promargin as usual with four teeth, second and fourth smaller; retromargin with three teeth. Otherwise typical of the genus as far as observed; teeth observed on paratype to avoid injury to holotype.

*Maxillae*. As usual in the genus in all observed features including the maxillary tooth in opposition to the palpal femoral ridge.

*Lip*. Wider than long in ratio of about 8 : 5; grooved transversely in basal third; reaches to about the middle of the maxillae. Sternal suture definitely procurved.

*Sternum*. Scutiform; longer than wide in ratio of 47 : 37; a narrow sclerite continues between fourth coxae which are separated by about one-sixth of their width; with the usual supply of long stiff bristles or spinules.

*Legs*. 1243. Width of first patella at "knee" .4115 mm., tibial index of first leg 9. Width of fourth patella at "knee" .3357 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.095	1.300	3.445	2.990	1.170	13.000
2.	3.120	1.235	2.405	2.502	1.105	10.367
3.	1.950	.845	1.105	1.040	.650	5.590
4.	2.925	1.202	1.885	2.015	.780	8.807
Palp	.401	.282	.217	—	.909	1.809

Ventral distal retrolateral hook and dorsal tubercle on first coxa together with proximal prolateral ridge and groove on second femur apparently normal for males of the genus.

*Spines*. First leg: femur dorsal 0-1-0-1-1, prolateral essentially the same, retrolateral 0-0-0-1-1, ventral apparently only one on promargin near distal end and 0-0-0-1-1 on retromargin; patella

dorsal 1(weak)-1, prolateral 0-1-1, retrolateral 0-0-1; tibia dorsal 0-1-0-1-1-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-2-lp-lp-2; metatarsus dorsal 0-1-0-0-0, prolateral 0-1-1-0, retrolateral 0-1-0-1-0, ventral lr-lp-lr-lp-0. Second leg: femur as in first except ventral apparently only one on promargin near distal end and four on retromargin, all in distal two-thirds of segment; patella as in first; tibia dorsal 0-1-0-1-1-0, prolateral 1-1-1-0, retrolateral 0-1-1-1, ventral 2-lp-lr-lp-lp-2 (Fig. 97); metatarsus dorsal 0-0-1-0, prolateral 0, retrolateral 0-0-0-1-0, ventral lr-lp-lr-lp-0. Third leg: femur dorsal and prolateral 0-0-1-1-1, retrolateral only one near distal end, ventral three on each margin and all six in distal two-thirds of segment; patella dorsal 0-1-0-1, prolateral and retrolateral 0-1; tibia dorsal 1-0-1-0, prolateral 1-0-1, retrolateral 0-1-1, ventral lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-1, retrolateral 0-1-0, ventral 1-1-1-1. Fourth leg: femur dorsal as in third, prolateral 0-0-1-1, retrolateral only one near distal end, ventral as shown in Figure 98; patella as in third; tibia dorsal 0-1-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-0, ventral 2-lp-lp-2; metatarsus dorsal 0-1-0-1-0, prolateral 0-1-0-1-1, retrolateral 0-0-1-1-0, ventral 0-lp-0-0.

*Palp.* Complicated; basal femoral ridge, patella, and tibia essentially as in *E. scitula* sp. nov. Tarsus: basal tarsal apophysis a typical, somewhat distorted arrow-head in shape; the clavis is moderately robust, only slightly excavated at its base; the uncus has a very pronounced shoulder at its base and curves around in contact with the conductor as a robust hook; the conductor is large, has a shallow depression to receive the uncus, is finely setose along its anterior surface which is differentiated into a concave and a rounded portion against which the distal end of the embolus is applied; the vesicle is of moderate size and is in the typical position; the embolus appears to have distinctive form best shown in drawings; the terminal laminae have a series of conspicuous sharp carinae, a marked low tubercle, together with a strongly raised portion contiguous to the conductor (Figs. 99-100).

*Abdomen.* Total length 2.99 mm.; 2.47 mm. wide; with the usual round-triangular form; with the usual supply of long slender dorsal and dorsolateral spinules; other observed features typical of the genus.

*Color in alcohol.* Carapace yellowish with considerable brownish color in the form of irregular spots and radiations from the thoracic groove; there is a suggestion of a series of dots in a transverse row such as occurs in so many species of the genus; these come out quite clearly in a paratype as a row across at the posterior third of the groove. The sternum is yellowish with a broad grayish margin. The legs are much spotted and banded with brown. Abdomen: there is a well marked brownish dorsal folium; there are three black spots along the dorsolateral regions on each side; the venter has a darker quadrilateral area between the genital groove and the base of the spinnerets but the common central white spot is only barely indicated.

*Type locality.* The male holotype and a single mature male paratype are both from El Volcan, R. P., August, 1950.

EUSTALA MONTIVAGA sp. nov.

(Figures 101-102)

*Female holotype.* Total length of 7.80 mm. Carapace 3.185 mm. long; 2.5 mm. wide opposite second coxae where it is widest; .975 mm. tall and, therefore, .39 as tall as wide; median longitudinal thoracic groove moderately well marked but less conspicuous than in some other species of *Eustala*; with a moderately well developed coat of light yellowish hair and numerous short spinules especially on the cephalic region.

*Eyes.* Eight in two rows, all dark; viewed from above, both rows strongly recurved; viewed from in front, anterior row practically straight, measured by centers; central ocular quadrangle wider in front than behind in ratio of 10 : 9; wider in front than long in ratio of 10 : 9. Ratio of eyes AME : ALE : PME : PLE = 7 : 5 : 6 : 4.5. AME separated from one another by ten-sevenths of their diameter, from ALE by 2.5 times their diameter. PME separated from one another by four-thirds of their diameter, from PLE by about three times their diameter. Laterals separated from one another by slightly less than the diameter of PLE. Height of clypeus equal to four-sevenths of the diameter of AME.

*Chelicerae.* With basal boss moderately well developed; basal segment 1.17 mm. long; each with long slender bristles in front,

medially directed and overlapping; fang groove well marked and with small dentules; fang groove with four promarginal teeth, the most distal of which is small, and with three retro-marginal teeth all fairly robust (on the right side a dentule occurs just external to the most distal normal tooth).

*Maxillae.* Appear to be entirely typical of the genus.

*Lip.* Wider than long in ratio of 14 : 9. Sternal suture pro-curved.

*Sternum.* Scutiform; moderately convex, especially opposite coxae; scalloped opposite coxae; longer than wide in ratio of 57 : 55; widest between intervals separating second and third coxae but nearly as wide between intervals separating first and second coxae; not continued between fourth coxae which are separated by about one-fourth of their width.

*Legs.* 1243. Width of first patella at "knee" .484 mm., tibial index of first leg 10. Width of fourth patella at "knee" .44 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.770	1.625	3.445	2.860	1.105	12.805
2.	3.380	1.430	2.860	2.470	1.040	11.180
3.	1.982	.845	1.105	1.105	.780	5.817
4.	3.120	1.310	2.080	2.145	.910	9.565

*Spines.* In general this species is apparently less spiny than usual in the genus. First leg: femur dorsal 0-1-0-1, prolateral 0-0-1-0-1-1, retrolateral 0-0-0-1-1, ventral 0; patella dorsal 0-1, prolateral 0-1-0, retrolateral 0-0-1; tibia dorsal 0-1-0-1-1-0, prolateral 0-1-0-1-0, retrolateral 0-0-1-0-1-0, ventral 1p-2-2-0-2 (two pairs near middle quite irregular); metatarsus dorsal 0-0-1-0, prolateral 0, retrolateral 0-1-1, ventral 2-lp-lr-lp-0. Second leg: femur essentially as in first; patella as in first with spines weak; tibia as in first except ventral 2-2 (irregular)-lp-0-2; metatarsus dorsal 0-1-0-0, prolateral 0, retrolateral 0-0-1-0, ventral 2-2 (irregular)-lp-0. Third leg: femur dorsal 0-1-1-1, prolateral 0, retrolateral only one near distal end; patella only dorsal 1-1 (both weak); tibia dorsal 0-1-0-1-0 (both weak), prolateral 0-1-0, retrolateral 0, ventral 1-1-0 (both nearly median); metatarsus dorsal 0-1-0, prolateral 0-1-0-1, retrolateral 0, ventral 1-1-1-1 (all median). Fourth leg: femur dorsal 0-1-0-1, prolateral apparently 0,

retrolateral only one weak spine near distal end, ventral only two on retromargin near distal end; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0-1; tibia dorsal 0-1-1-1-0, prolateral 0-1-1, retrolateral 0-1-1-0, ventral 1p-1p-2; metatarsus dorsal 1-1-0, prolateral 0-1-1-1, retrolateral 0-1-0, ventral 0-1-1-1.

*Abdomen.* With the common round-triangular form and slight suggestions of shoulder humps; 5.53 mm. long; 4.94 mm. wide; with numerous recurved short spinules but apparently no long ones such as occur in other species. Other features essentially typical of the genus.

*Epigynum.* Similar to that of *E. semifoliata* (O. P. Cambridge) but with certain clear differences (Figs. 101-102). Relatively short and broad; the scape gradually broadens to the base; apertures small and about four diameters of one of them apart; spermathecae a little less than a diameter apart.

*Color in Alcohol.* Legs and palps yellowish with large dark brown patches and rings together with smaller spots. Carapace yellowish with four dark dots in two transverse rows in middle of dorsal area (one paratype has these dots arranged in three rows with two in the first, three in the second and four in the third). Sternum dusty yellow with a broad grayish margin. Abdomen: with a moderately distinct brownish dorsal folium; outside of the folium the dorsal and dorsolateral areas are whitish from many subchitinous granules; the venter has a median darker spot with irregular boundaries and whitish patches but without the two conspicuous white spots possessed by *E. semifoliata*; a narrow black ring surrounds the bases of the spinnerets.

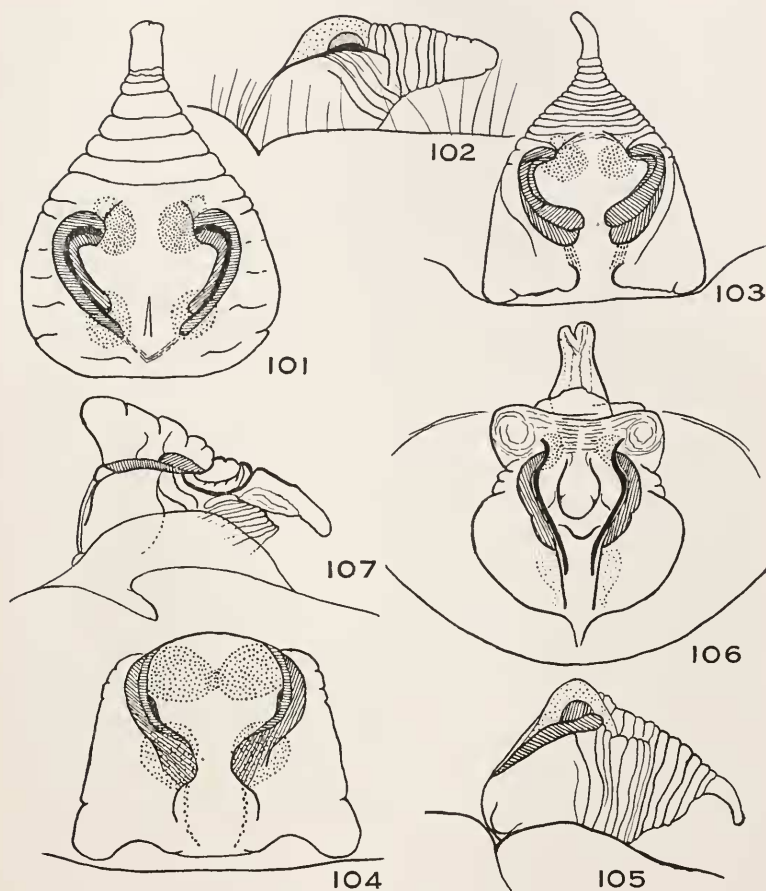
*Type locality.* Female holotype and two smaller but mature female paratypes from El Volcan, R. P., August, 1950.

#### EUSTALA PANAMANA sp. nov.

(Figures 103-105)

*Female holotype.* Total length 5.265 mm. Carapace 2.275 mm. long; 1.82 mm. wide opposite interval between second and third coxae where it is widest; .66 mm. tall opposite second coxae where it is tallest and, therefore, about .36 as tall as wide; rises gradually from PME to highest point and then descends grad-





External Anatomy of *Eustala*  
 Figures 101-102, *E. montivaga*  
 Figures 103-105, *E. panamana*  
 Figures 106-107, *E. redundans*

- Fig. 101. Epigynum from below.  
 Fig. 102. Epigynum, lateral view.  
 Fig. 103. Epigynum from below.  
 Fig. 104. Epigynum, a more posterior view.  
 Fig. 105. Epigynum, lateral view.  
 Fig. 106. Epigynum from below.  
 Fig. 107. Epigynum, lateral view.

ually to posterior margin; with well marked median longitudinal thoracic groove and only moderately convex lateral to the groove.

*Eyes.* Eight in two rows, all dark; viewed from above both rows strongly recurved; viewed from in front, anterior row slightly procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 33 : 30, slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 5.5 : 4 : 5 : 4. AME separated from one another by 18/11 of their diameter, from ALE by twice their diameter. PME separated from one another by seven-fifths of their diameter, from PLE by a little more than three times their diameter. Laterals separated from one another by slightly more than their radius. Height of clypeus nearly equal to the diameter of AME.

*Chelicerae.* Basal segment .77 mm. long; general features typical of the genus; fang groove well marked and with four promarginal teeth and three retromarginal teeth.

*Maxillae.* Appear to be completely typical of the genus in all observed features.

*Lip.* Wider than long in ratio of about 2 : 1; well rounded along distal margin so that the organ is nearly semicircular in outline. Sternal suture procurved.

*Sternum.* Scutiform; longer than wide in ratio of 6 : 5; moderately convex but with additional convexities opposite all coxae; not continued between fourth coxae which are separated by nearly one third of their width.

*Legs.* 12+3. Width of first patella at "knee" .352 mm., tibial index of first leg 11. Width of fourth patella at "knee" .330 mm., tibial index of fourth leg 15.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.795	.975	2.275	1.690	.845	8.580
2.	2.275	.900	1.755	1.625	.845	7.400
3.	1.495	.583	.780	.780	.640	4.278
4.	2.437	.910	1.397	1.462	.747	6.953

*Spines.* First leg: femur dorsal 0-1-0-1-1, prolateral 0-0-1-1-1-0, retrolateral 0-0-0-0-1-1, ventral apparently only one on each margin near distal end and both weak; patella dorsal 1-1, prolateral 0-1-0-0, retrolateral 0-0-1-0; tibia dorsal 0-1-1-1-0, prolateral nearly the same, retrolateral 0-1-1-0, ventral lp-0-lp-0;

metatarsus dorsal 0-1-1-1, prolateral only bristles, retrolateral 0, ventral 2-2-0. Second leg: femur dorsal 0-1-0-1, prolateral and retrolateral only one near distal end, ventral apparently only one weak spine on retromargin near distal end; patella as in first; tibia dorsal as in first; prolateral and retrolateral 0-1-0-1-0, ventral 2-lp-lr; metatarsus dorsal 0-1-0-1-0-0, prolateral 0-1-0-1-0, retrolateral 0-1-0-0, ventral 0-lr-0-0. Third leg: femur dorsal 0-1-0-1, prolateral and ventral 0, retrolateral 0-0-1, patella as in first except prolateral 0; tibia dorsal 0-1-0-0, prolateral and retrolateral 0, ventral lp-lp-2; metatarsus dorsal 0-1-1-1, prolateral 0-1-0-0, retrolateral 0-0-1(weak)-0, ventral 1-1-1-1(all median). Fourth leg: femur dorsal 0-1-1-1, prolateral and retrolateral only one near distal end, ventral apparently one on each margin near distal end and both weak; patella essentially as in first; tibia dorsal 0-1-0-1-0, prolateral 0-1-1-0, retrolateral 0-1-0, ventral lp-lp-2; metatarsus dorsal 0-1-0-1-0-0, prolateral 0-1-1-0, retrolateral 0-1-0-0, ventral 0-0-1 (median). Tarsal claws as usual in the genus. Palpal claw long, slender, gently curved; pectinate in a single row of about nine teeth increasing in length distally.

*Abdomen.* With the usual round-triangular form but more rounded than usual; 3.282 mm. long; 3.25 mm. wide at greatest width about one fourth from base; high as well as relatively broad; with a moderate supply of long spinules; other features appear to be typical of the genus.

*Epigynum.* Relatively broad; with scape gradually narrowed from base to tip which is not rugulose like the broader part; the apertures are three to four diameters apart; the spermathecae are close together and when viewed from a posterior position seem to be in contact; the oval part of the base is prominent (Figs. 103-105).

*Color in alcohol.* Legs and mouth parts generally yellowish with dark spots of various sizes. Carapace: yellowish with considerable dusty gray over the cephalic area; this extends back as a median stripe through most of the length of the median thoracic groove; the cephalic area has a more or less V-shaped, white spot caused by an accumulation of subchitinous granules; there is a black dot on each side just in front of the median groove and a transverse row of four black dots at about the middle of the groove. The lip is white in the middle at the base but gray else-

where. The sternum is light grayish with irregular white subchitinous spots and opposite each coxa there is a much darker rounded spot. Abdomen: nearly white from a large number of angular subchitinous granules; with a faintly outlined dorsal folium; there is an elongated white spot just behind the genital groove and this is bordered by a short narrow, nearly black stripe on each side.

*Type locality.* The holotype is from Cerro Punta, Chiriqui, R. P., March, 1936 (W. J. Gertsch). There are two mature female paratypes and what I assume to be an immature male from the same locality and probably collected at the same time.

EUSTALA REDUNDANS sp. nov.

(Figures 106-107)

*Female holotype.* With the conventional round-triangular form. Total length 6.175 mm. Carapace 2.41 mm. long; 2.08 mm. wide opposite interval between second and third coxae where it is widest; .968 mm. tall and, therefore, about .47 as tall as wide; median longitudinal thoracic groove well defined; with numerous short brown spinules especially on the cephalic part together with a moderately well developed coat of light colored procumbent hair.

*Eyes.* Eight in two rows, all dark as usual; viewed from above, posterior row strongly recurved; viewed from in front, anterior row definitely procurved; central ocular quadrangle wider in front than behind in ratio of 11 : 9, wider in front than long in ratio of 33 : 29. Ratio of eyes AME : ALE : PME : PLE = 9 : 7.5 : 9.5 : 8. AME separated from one another by twice their diameter, from ALE by slightly more than three times their diameter. PME separated from one another by about 6/5 of their diameter, from PLE by a little more than four times their diameter. Laterals separated from one another by 2/3 of the diameter of ALE. Height of clypeus equal to a little more than the diameter of AME.

*Chelicerae.* Basal segment .877 mm. long; general features agree well with the typical species of the genus. The fang groove is well defined and provided with the usual sets of teeth, four on promargin and three on retromargin.

*Maxillae.* Appear to be typical of the genus in all observed features.

*Lip.* Wider than long in ratio of about 5 : 4; reaches to somewhat beyond the middle of the maxillae. Sternal suture distinctly procurved.

*Sternum.* Scutiform; longer than wide in ratio of about 9 : 8; not continued between fourth coxae which are separated by a little less than one-fifth of their width; with low convexities opposite each coxa; with the usual supply of long stiff bristles.

*Legs.* 1243. Width of first patella at "knee" .4007 mm., tibial index of first leg 10. Width of fourth patella at "knee" .3899 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.380	1.170	2.925	2.740	.975	11.190
2.	2.925	1.170	2.340	2.275	.747	9.457
3.	1.885	.750	1.040	1.007	.682	5.364
4.	2.860	1.170	1.787	1.820	.785	8.422

*Spines.* First leg: femur dorsal 0-1-0-1-1, prolateral 0-0-1-1-0, retrolateral 0-0-0-1-1-0, ventral apparently only one on retromargin near distal end; patella dorsal 1(weak)-1, prolateral 0-1-0, retrolateral 0-1-1; tibia dorsal 0-1-1-1-0, prolateral 0-1-0-1-1, retrolateral 0-1-1-1, ventral 2-2-2-0-0 with considerable irregularity; metatarsus dorsal 0-1-1-0, prolateral 0, retrolateral 0-1-1-0, ventral 2-2-lp-0-0. Second leg: femur essentially as in first except ventral 0; patella as in first except right prolateral 0-1-1; tibia as in first except ventral lr-2-lr-lp-lr-lr(last two weak); metatarsus dorsal 0, prolateral 0-1-1-1-0, retrolateral essentially the same, ventral 0-lp-lr-0-0. Third leg: femur dorsal as in first, prolateral and retrolateral only one near distal end, ventral 0 but spinules in rows suggest reduced spines; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0; tibia dorsal 1-0-0, prolateral 0-1-0, retrolateral 0, ventral lp-lp-2(weak); metatarsus dorsal 0-1-1-0, prolateral and retrolateral 0-1-0, ventral lp-lp-lp-2(weak). Fourth leg: femur as in third except ventral one on retromargin near distal end; patella dorsal and prolateral as in third, retrolateral 0-0-1; tibia dorsal as in third, prolateral 1-1-1-1, retrolateral 0-1-1, ventral lp-lp-lp-2; metatarsus dorsal 0-1-1-0-0, prolateral 0-1-0-1-1, retrolateral 0, ventral lp-0-0-1.

*Abdomen.* 3.77 mm. long; 3.77 mm. wide at its widest place about one-fifth from base; with the usual round-triangular form. Other observed features appear to be typical of the genus.

*Epigynum.* Quite distinctive; apertures nearly three diameters apart; scape of moderate length and arises abruptly from base and appears bifid at its tip; the central part of base with a strongly developed postero-ventral projection different from that in any other known species (Figs. 106-107).

*Color in alcohol.* Carapace: pars thoracica mostly yellowish; the two rows of dots which so frequently appear in these species are present and in addition there is a brownish bar extending forward and laterally parallel to the cephalic groove; the latter is speckled with brown. The sternum is yellowish with grayish marginal spots covering the convexities. The legs are yellowish with many brown dots, larger spots, bars, and rings. Abdomen: the dorsal folium is moderately well outlined and extends forward as a narrow extension; near the middle of the dorsum there is an oval purplish spot, probably an individual mark; the remainder of the dorsum and dorsolateral regions is darkly colored from a combination of brown pigment, subchitinous yellowish-white granules in the form of dots, streaks, and larger irregular spots; the venter has a large quadrilateral area between the genital groove and base of the spinnerets containing an elongate oval white spot.

*Type locality.* The holotype is from Madden Dam Forest, C. Z., July, 1950. There are no paratypes.

EUSTALA RUSTICA sp. nov.

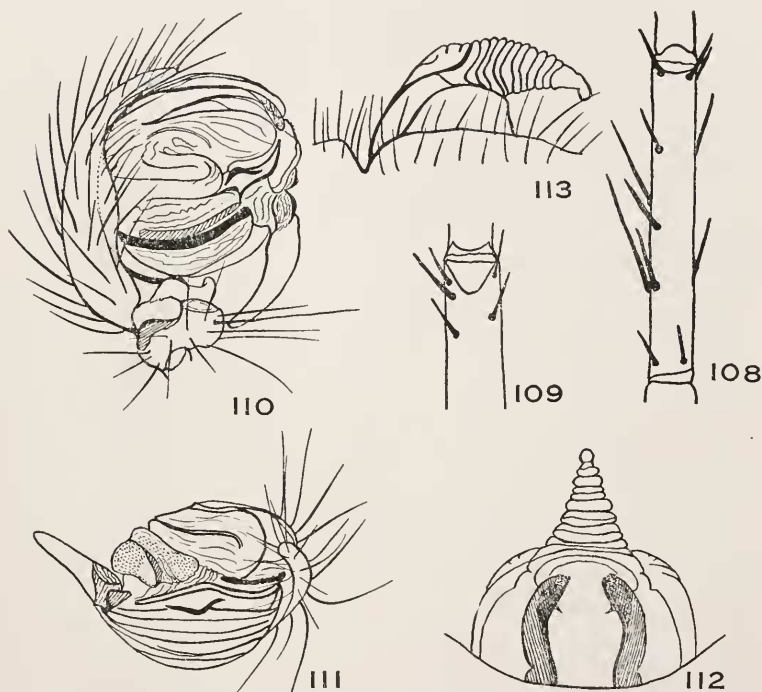
(Figures 108-113)

*Male holotype.* Total length 4.03 mm. Carapace 2.068 mm. long; 1.716 mm. wide opposite interval between second and third coxae where it is widest; .78 mm. tall and, therefore, about .45 as tall as wide; gently inclined from PME to beginning of steep posterior declivity; with well defined median longitudinal thoracic groove; with spines confined to ocular area; with a moderately well developed coat of light colored procumbent hair.

*Eyes.* As usual, eight in two rows, all dark; LE on moderately prominent tubercles; viewed from above, posterior row strongly



recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 19 : 16, wider in front than long in ratio of 19 : 16. Ratio of eyes AME : ALE : PME : PLE = 12 : 9 : 11 : 8. AME separated from one another and from ALE by their diameter. PME separated from one another by slightly more than their diameter, from PLE by a little less than three diameters. Laterals separated from one another by one-third of



External Anatomy of *Eustala*

Figures 108-113, *E. rustica*

- Fig. 108. Left second tibia of male from below.  
 Fig. 109. Distal half of right fourth femur from below.  
 Fig. 110. Tarsus of male palp, lateral view.  
 Fig. 111. Tarsus of male palp from distal end.  
 Fig. 112. Epigynum from below.  
 Fig. 113. Epigynum, lateral view.

the diameter of ALE. Height of clypeus equal to about the diameter of AME.

*Chelicerae.* Basal segment .594 mm. long. Fang groove well defined; promargin with four teeth, second and fourth smaller; retromargin with three teeth. Otherwise as usual and typical of the genus in all observed features.

*Maxillae.* As usual in the genus in all observed features including the maxillary tooth used in opposition to the palpal femoral ridge.

*Lip.* Only slightly wider than long; moderately grooved and transversely striated in basal half; reaches to about the middle of the maxillae. Sternal suture gently procurved.

*Sternum.* Scutiform; longer than wide in ratio of about 5 : 4; a narrow sclerite continues between fourth coxae which are barely separated; with the usual supply of long slender spinules.

*Legs.* 1243. Width of first patella at "knee" .2924 mm., tibial index of first leg 8. Width of fourth patella at "knee" .2491 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.315	1.108	2.665	2.275	.990	10.350
2.	2.600	.812	1.885	1.950	.910	8.157
3.	1.540	.528	.814	.902	.550	4.334
4.	2.405	.858	1.254	1.755	.780	7.052
Palp	.418	.253	.132	—	.792	1.595

Ventral distal retrolateral hook on first coxa, dorsal tubercle on first coxa, and prolateral proximal ridge and groove on second femur all well developed.

*Spines.* First leg: femur dorsal and prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1, ventral 0-0-1-0-1 on promargin and only one on retromargin near distal end; patella dorsal 1(weak)-1, prolateral 0-1-0, retrolateral 0-1-1; tibia dorsal 0-1-0-1-1-0, prolateral 0-1-0-1-0, retrolateral essentially the same, ventral 2-2-2-lp-2 with some irregularity; metatarsus dorsal 0-1-0-1-0-0, prolateral 0-1-0, retrolateral 0-1-1-0, ventral 1r-2-0-0. Second leg: femur dorsal as in first, prolateral and retrolateral 0-0-0-1-1, ventral apparently only one near middle on retromargin but lacking on right; patella dorsal as in first, prolateral and retrolateral 0-1-1; tibia dorsal 0-1-1-1-0, prolateral 0-1-1-0, retrolateral 0-1-1-1, ventral

2-lp-lp-lp-2 (Fig. 108); metatarsus dorsal 0-1-0-1-0-0, prolateral 0, retrolateral 0-1-0-1-0, ventral 0-2-lp-0. Third leg: femur dorsal as in first, prolateral and retrolateral only one near distal end, ventral three on promargin all in distal half and one on retromargin near distal end; patella dorsal and prolateral as in first, retrolateral 0-1-0; tibia dorsal 0-1-0-0, prolateral and retrolateral 0-1-1, ventral 0-lp-0-2; metatarsus dorsal 0-1-1-0, prolateral 0-1-1, retrolateral 0, ventral 2?-lp-lp-lp. Fourth leg: femur dorsal as in first, prolateral 0-0-0-1-1, retrolateral only one near distal end, ventral two on promargin and three on retromargin (four on retromargin of left femur), all in distal third of segment (Fig. 109); patella as in third; tibia dorsal 1-1-1-0, prolateral 0-1-1-1, retrolateral 0-1-1, ventral 2-lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-1-1, retrolateral 0-1-1-0, ventral 0-lp-0-0. Ventral distal retrolateral hook and dorsal tubercle on first coxa well developed; proximal prolateral groove and ridge on second femur well defined.

*Palp.* Complicated; basal femoral ventral ridge, patella, and tibia all typical of the genus. Tarsus: basal tarsal apophysis as usual a somewhat distorted arrow-head in shape; the clavis is moderately robust, not notably excavated at its base but with a groove and sharp ridge; the uncus is a rather slender long pointed hook with a rounded shoulder at its base; the conductor is of moderate size, with a ventral depression for the reception of the uncus and a moderately deep depression on its anterior surface where it is finely setose; the vesicle is of moderate size and in its typical position; the embolus is robust, grooved into a trough, its free part is short and accompanied by a membrane; the terminal laminae are not strikingly differentiated but there is a thin chitinous extension at the base of the clavis (Figs. 110-111).

*Color in alcohol.* Both known male specimens of this species are light colored. The carapace is bright yellowish with a few pale brownish dots; one pair of these occurs at the middle of the thoracic groove; another pair of larger dots lies at the base of the pars cephalica and a third pair about halfway between PME and the anterior end of the thoracic groove. The sternum is yellowish with gray flecks around the margin. The legs are yellowish with pale brownish bars, rings, and spots. Abdomen:

a well developed dorsal folium exists but elsewhere dorsally and dorsolaterally this part of the body is white from the accumulation of many subchitinous granules; there is a small central white spot with a dark irregular spot on each side of this in the area between the genital groove and the base of the spinnerets. The paratype agrees well with the holotype except that there is more color on the carapace.

Although certainty is lacking, I think the evidence is sufficient to allow the pairing of the females described below with males already described as *E. rustica* sp. nov. The specimen selected as the allotype is somewhat distorted by preservation but is in good condition otherwise.

*Female allotype.* Total length 5.72 mm. Carapace 2.275 mm. long; 1.82 mm. wide opposite interval between second and third coxae where it is widest; .975 mm. tall and, therefore, about .54 as tall as wide; steep posterior declivity somewhat more pronounced than in male.

*Eyes.* Central ocular quadrangle only slightly wider in front than behind; only slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 11 : 8 : 11 : 7.5. AME separated from one another by about one and one-quarter times their diameter, from ALE by nearly twice their diameter. PME separated from one another by slightly more than their diameter, from PLE by three times their diameter. Laterals separated from one another by slightly more than the radius of ALE. Height of clypeus equal to slightly less than the diameter of AME.

*Chelicerae.* Basal segment .758 mm. long. Otherwise essentially as in male.

*Maxillae.* Apparently as in male in all essential features.

*Lip.* Wider than long in ratio of 4 : 3. Otherwise essentially as in male.

*Sternum.* Longer than wide in ratio of 40 : 37. The spinules show more clearly than in male; these consist of many short spinules and longer and more robust ones situated as follows: at the posterior end there is a group of four; opposite each of the coxae except the fourth there is a pair; in addition to these four others make a nearly transverse row between the first coxae. Similar spinules were probably present in the male before

handling and agitation in the vials. Otherwise essentially as in the male.

*Legs.* 1243. Width of first patella at "knee" .3682 mm., tibial index of first leg 10. Width of fourth patella at "knee" .3249 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.120	1.170	2.535	2.080	.942	9.847
2.	2.567	1.040	2.080	1.787	.845	8.319
3.	1.495	.660	.858	.942	.617	4.572
4.	2.372	.845	1.690	1.657	.780	7.344

*Spines.* First leg: femur dorsal 0-1-0-1, prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1, ventral 0; patella dorsal 1(weak)-1, prolateral 0-1-0, retrolateral 0-1-1; tibia dorsal 0-1-0-1-1-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-lp-lp-0-lr; metatarsus dorsal 0-1-0-1-0-0, prolateral 0, retrolateral 0-1-0-1-0, ventral 0-2-lp-0. Second leg: femur as in first except prolateral 0-0-0-1-1; patella as in first; tibia as in first except ventral 2-lp-0-2; metatarsus as in first except ventral 1r-2-lp-0-0. Third leg: femur dorsal as in first, prolateral and retrolateral only one near distal end, ventral spinules probably not to be regarded as spines; patella apparently only dorsal 1-0, tibia dorsal 1-0-0, prolateral 0, retrolateral 0-0-1, ventral 1r-1r-2; metatarsus dorsal 0-1-1-0, prolateral and retrolateral 0-1-0, ventral 1p-lp-lp-lp. Fourth leg: femur as in third except ventral one on promargin near distal end; patella dorsal 1-0, prolateral 0-1; tibia dorsal and prolateral 0-1-0-1-0, retrolateral 0-1-0, ventral 1p-0-2; metatarsus dorsal and prolateral 0-1-0-1-0, retrolateral 0, ventral 0-0-1. Palp: with fewer spines and spinules than is usual in the genus.

*Abdomen.* 3.77 mm. long; 3.445 mm. wide about one-fourth from base. Apparently with slightly indicated shoulder humps. Otherwise essentially as in male.

*Epigynum.* Base broad; scape of moderate length and gradually narrowed to tip. Apertures small and about two diameters apart. The central conspicuous part of the base relatively narrow and longer than usual. Tip of scape turned dorsally (Figs. 112-113). Figure 113 is from the paratype because the base is more completely expanded and shows in profile to much better advantage.

*Color in alcohol.* The female allotype is much more deeply colored than the male holotype or the single female paratype. The carapace lacks the dots but nearly the whole pars cephalica is brown; there is also a pair of brownish bands each reaching out from the thoracic groove a little posterior to the pars cephalica. Abdomen: the dorsal folium is well developed; there is a pair of small white dorsal dots near the base; the numerous white granules so conspicuous in the males are nearly all obscured in the female allotype; the venter is like that of the male except that there is more of the dark brown color.

*Type locality.* The holotype male and the allotype female are from El Valle, R. P., July, 1936. Paratypes of both sexes are in the collection from the same locality and collected at the same time.

EUSTALA SCITULA sp. nov.

(Figures 114-117)

*Male holotype.* Total length 5.525 mm. Carapace 3.055 mm. long; 2.535 mm. wide opposite interval between second and third coxae where it is widest; 1 mm. tall opposite third coxae and, therefore, about .4 as tall as wide; rises considerably but gradually to beginning of steep posterior declivity; with well developed median longitudinal thoracic groove; spines confined to ocular area.

*Eyes.* As usual, eight in two rows, all dark; LE tubercles less prominent than in many species of the genus; viewed from above, posterior row strongly recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 42 : 33; wider in front than long in ratio of 21 : 19. Ratio of eyes AME : ALE : PME : PLE = 13 : 8.5 : 11 : 8.5. AME separated from one another by about five-thirds of their diameter, from ALE by a little more than twice their diameter. PME separated from one another by a little more than their diameter, from PLE by a little less than four times their diameter. Laterals separated from one another by a little more than their radius. Height of the clypeus equal to a little more than the diameter of AME.



*Chelicerae.* Basal segment .780 mm. long. Fang groove well defined; promargin with four teeth, second and fourth smaller as usual; retromargin with three teeth but two and four have been found among the paratypes which were examined to avoid injury to the holotype; weaker than usual in males of the genus.

*Maxillae.* In general, as usually found in the genus, including the lateral tubercle or tooth used in opposition to the palpal femoral ridge.

*Lip.* Only slightly wider than long; reaches to about the middle of the maxillae. Basal half moderately grooved. Sternal suture definitely procurved.

*Sternum.* Scutiform; longer than wide in ratio of about 5 : 4; a narrow sclerite continues between fourth coxae which are barely separated; rather deeply scalloped opposite all coxae; probably with few bristles or spinules in life.

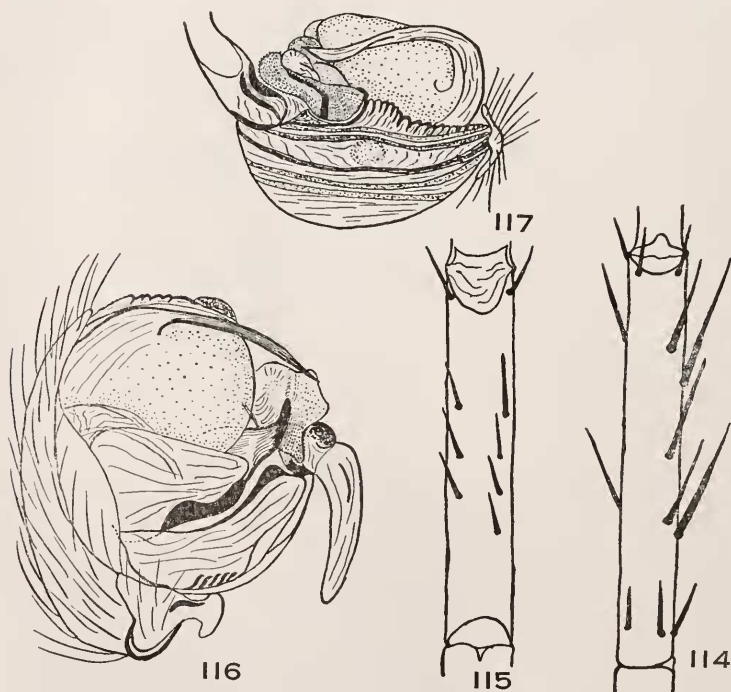
*Legs.* 1243. Width of first patella at "knee" .444 mm., tibial index of first leg 8. Width of fourth patella at "knee" .4115 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.680	1.365	3.900	3.250	1.300	14.495
2.	3.445	1.235	2.535	2.730	1.170	11.115
3.	2.080	.780	1.105	1.105	.650	5.720
4.	3.315	1.300	2.210	2.470	1.050	10.345
Palp	.466	.325	.184	—	.940	1.915

First coxae with the usual well developed ventral distal retrolateral hook and the dorsal tubercle; prolateral groove and ridge on second femur also well developed.

*Spines.* First leg: femur dorsal 0-0-1-1-1, prolateral left 0-0-1-1-1-1-1, right 0-0-1-2-0-1, retrolateral 0-0-1-1-1, ventral with several irregularities not recorded; patella dorsal 0-1, prolateral and retrolateral 0-1-1; tibia dorsal 0-1-0-1-1-0, prolateral 0-1-0-1-1, retrolateral 0-0-1-1-0, ventral 2-2-2-2-2; metatarsus dorsal 0-1-0-1-0-0, prolateral 0, retrolateral 0-0-1-1-0, ventral 2-lp-lr-lp-0. Second leg: femur dorsal 0-1-1-1, prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1, ventral four on retromargin and apparently only one on promargin near distal end; patella as in first; tibia dorsal essentially as in first, prolateral 1-1-1-0, retrolateral 0-1-1-1, ventral 2-lp-lp-lp-2 (Fig. 114); metatarsus dorsal 0-1-0, pro-

lateral 0-1-1-0, retrolateral the same except for minor differences in position, ventral lr-lr-0-0. Third leg: femur dorsal 0-0-1-1-1, prolateral and retrolateral 0-0-0-1-1, ventral three on promargin and two on retromargin; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-0; tibia dorsal 1-0-1-0, prolateral and retrolateral 0-1-1, ventral lp-lp-lp-2 (second lacking on right); metatarsus dorsal 0-1-0, prolateral 0-1-1, retrolateral 0-1-0, ventral 1-1-1-1. Fourth leg: femur dorsal and prolateral as in third, retrolateral only one near distal end, ventral four on promargin and five on retromargin (Fig. 115), all in distal three-fourths of



External Anatomy of *Eustala*

Figures 114-117, *E. scitula*

- Fig. 114. Right second tibia from below.  
 Fig. 115. Left fourth femur from below.  
 Fig. 116. Tarsus of male palp, lateral view.  
 Fig. 117. Tarsus of male palp from distal end.

segment; patella as in third; tibia dorsal 1-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-1, ventral 2-lp-lp-2; metatarsus dorsal 1-0-1-0, prolateral and retrolateral 0-1-1-0, ventral 0-lp-lp-1 (weak).

*Palp.* Complicated; basal femoral tubercle or ridge opposing the maxillary tooth well developed; patella short, with the usual weak dorsal proximal spine or spinule and the long slender distal dorsal spine; the tibia is also short and distinctly trilobed, the chitinous ventral rim of the articular lobe well developed; the femur has a well developed dorsal distal spine. Tarsus: the basal tarsal apophysis has the typical distorted arrowhead shape; the clavis is fairly robust and has a small shallow concave surface at its base; the uncus is a robust spine fitting into a very narrow depression in the conductor; the conductor is a massive structure with a narrow longitudinal groove on its ventral surface and a fairly deep depression and related surfaces on its distal end which is extensively setose; the vesicle is large and occupies the typical position; the embolus is fairly long and moderately slender; the terminal laminae are much wrinkled and strongly chitinized (Figs. 116-117).

*Abdomen.* Total length 3.25 mm.; 2.405 mm. wide; with the usual round-triangular form; with the usual supply of long slender dorsal and dorsolateral spinules; other observed features typical of the genus.

*Color in alcohol.* The general color of the carapace is yellowish; behind PME there is a pair of pale brownish spots somewhat elongated; the remainder of the dorsal part of the carapace is covered with an irregular brownish spot; the dots, so commonly present, do not show in the holotype and very seldom among the paratypes. The sternum is yellowish irregularly margined in gray. Legs: generally yellowish but with anterior femora brown in the distal three-fourths; the second and fourth femora are essentially like the first; all segments distal to the patellae are banded with brown. Abdomen: the dorsal folium is well developed but differs greatly among the paratypes; the most persistent features appear to be an oval white spot set into the middle of the usual dark ventral area between the genital groove and base of the spinnerets, but this may be almost circular in shape in certain paratypes.

*Type locality.* The holotype is from Barro Colorado Island, C. Z., July, 1950. Male paratypes have been collected from the following localities: Barro Colorado Island, C. Z., June-August, 1936; March, 1936 (Gertsch); August, 1939; July, 1950; Canal Zone Forest Reserve, C. Z., August, 1936 and July, 1939; Summit, C. Z., July-August, 1950. One specimen from near Hidalgo, Mexico, July, 1936 (Davis) and another from Cuyutlan, Colima, Mexico, January, 1943 (F. Bonet) are somewhat hesitantly assigned to the species.

EUSTALA SCUTIGERA (O. P. Cambridge)

(Figures 118-123)

*Epeira scutigera* O. P. Cambridge, 1898

*E. nava* O. P. Cambridge, 1899

*Eustala scutigera* F. P. Cambridge, 1904

*Epeira scutigera* Banks, 1909

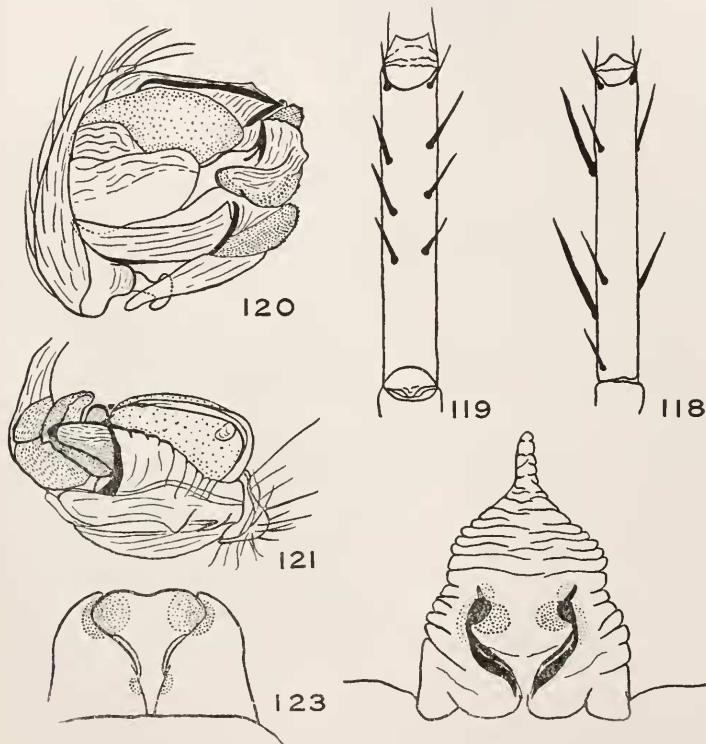
*Eustala scutigera* Petrunkevitch, 1911

*E. s.* Petrunkevitch, 1925

Considerable doubt has hitherto existed as to the identification of this species. The figures published by the Cambridges are not as revealing and definite as desired. The male from the British Museum has a clearly lobed conductor as suggested by F. P. Cambridge's figure. The chief difficulty now arises from the fact that another male from the British Museum labelled *E. guttata* also has an identically lobed conductor and other features like this species. The conclusion that the Cambridges were, at least in this instance, using mixed material seems inescapable. It is also difficult to separate females from those of *E. vegeta* (Keyserling). About the only way to separate them is by using the features of the epigynum; in *E. vegeta* the apertures are further apart than in *E. scutigera* and there are differences in the way in which the scape arises from the base.

*Male hypotype.* Total length 3.965 mm. With the abdomen round-triangular as usual. Central ocular quadrangle wider in front than behind in ratio of 34 : 29, slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 12 : 8.5 : 9.5 : 8.5. AME separated from one another by seven-sixths of their diameter, from ALE by four-thirds of their diameter.

PME separated from one another by slightly more than their diameter, from PLE by about three times their diameter. Laterals separated from one another by about one-third of their diameter. A pair of long slender spines arises between AME and PME; and another similar spine arises just behind PLE. Height of clypeus equal to the diameter of AME. Promargin of



External Anatomy of *Eustala*  
Figures 118-123, *E. scutigera*

- Fig. 118. Left second tibia from below.  
Fig. 119. Left fourth femur from below.  
Fig. 120. Male palpal tarsus, lateral view.  
Fig. 121. Male palpal tarsus from distal end.  
Fig. 122. Epigynum from below.  
Fig. 123. Epigynum, a more posterior view.

fang groove with four teeth; retromargin with three. The secondary sexual characters on the maxillae, first coxae, and second femora appear as usual.

*Legs.* 1243. Width of first patella at "knee" .2924 mm., tibial index of first leg 8. Width of fourth patella at "knee" .2383 mm., tibial index of fourth leg 9.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.380	1.072	2.535	2.145	.877	10.009
2.	2.730	.950	1.950	1.852	.845	8.327
3.	1.430	.520	.910	.812	.520	4.192
4.	2.275	.910	1.560	1.560	.715	7.020
Palp	.433	.173	.162	—	.770	1.538

The important spination of the second tibia is shown in Figure 118. The first femur appears to have no ventral spines; the second femur has a short robust spine on the retromargin a little distal to the middle and a pair of weak spines near the distal end; the third femur has three fairly robust ventral spines on the promargin; the fourth femur has a double series of ventral spines with four robust spines on each margin (Fig. 119). Considerable variation in spination has been noted among my specimens.

*Palp.* It seems reasonably certain from F. P. Cambridge's figure and the specimens from the British Museum that this is the species named *Epeira scutigera* by the elder Cambridge. Features of femora, patellae, and tibiae apparently typical of the genus. Tarsus: basal tarsal apophysis a twisted arrow-shape; clavis moderately robust, with a long basal articular surface contiguous to the conductor but not excavated; the uncus is a robust hook, broad at its base and with its tip somewhat recurved; the conductor is hollowed out for the reception of the uncus and provided with a distinct setose lobe; the vesicle is moderately large; the embolus is relatively long and nearly straight along its distal border from the basal elbow to the tip; the terminal laminae show a very conspicuous elevation and together with the conductor show several distinctive surfaces (Figs. 120-121). Degrees of chitinization and folding of the parts in the resting condition alter to some extent the appearance of some of these parts and make it difficult to place certain individuals in the collection.



*Female hypotype.* Total length 4.68 mm. With the same general form as in the male.

*Legs.* 1243. Width of first patella at "knee" .3249 mm., tibial index of first leg 10. Width of fourth patella at "knee" .2816 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.990	1.105	2.080	1.852	.747	8.774
2.	2.405	1.007	1.690	1.852	.747	7.701
3.	1.365	.590	.715	.747	.585	4.002
4.	2.145	.975	1.365	1.300	.650	6.435

Ventral femoral spines appear to be rather uniformly lacking in females but may occasionally occur.

*Epigynum* (Figs. 122-123). The base is massive with the scape abruptly narrowed in its terminal third; apertures more than their width from the lateral side of the epigynum and about three diameters apart; spermathecae one diameter apart; closely resembles that of *E. vegeta*.

*Color in alcohol.* As usual the color pattern is extremely variable. In both sexes there are two transverse rows of small brownish dots across the carapace; the folium is clear in both hypotypes but may be lacking in some specimens; in both hypotypes the venter has a somewhat elongated central white spot in the middle of a dark area which is margined by incurved white marks; the central white spot appears to be more persistent than the other marks; the sternum is usually yellowish with marginal brown spots opposite the coxae.

*Type locality.* Male hypotype from Barro Colorado Island, C. Z., July, 1936; the female hypotype is from the same locality, August, 1939. Males and females from Mexico: Cerro Azul, Vera Cruz, March, 1945 (E. K. Waering); Mapastepec, Chiapas, June-July, 1940 (H. Wagner); Teotitlan, Oaxaca, Sept., 1944 (H. Wagner); Papanto, Vera Cruz, October, 1947 (H. Wagner). Guatemala: Patulul, January, 1912 (W. M. Wheeler); Antigua, August, 1947 (C. & P. Vaurie). Nicaragua: Granada (C. F. Baker), Honduras: Subirana, Yoro, (Stadelman). Panama: Barro Colorado Island, C. Z., June-August, 1936; July-August, 1939; June-July, 1950; El Valle, July, 1936; Porto Bello, August, 1936; Ft. Sherman, C. Z., August, 1939; Boquete, July, 1939 and August, 1950.

## EUSTALA SEDULA sp. nov.

(Figures 124-126)

*Female holotype.* Total length 6.89 mm. Carapace 2.925 mm. long; 2.6 mm. wide opposite interval between second and third coxae where it is widest; .975 mm. tall and, therefore, about .38 as tall as wide; median longitudinal thoracic groove well defined and typical of the genus; with well developed coat of yellowish white procumbent hair and numerous spinules especially on the pars cephalica.

*Eyes.* Eight in two rows, all dark as usual; viewed from above, posterior row definitely recurved; viewed from in front, anterior row definitely procurved; central ocular quadrangle as wide behind as in front, wider than long in ratio of 11 : 10. Ratio of eyes AME : ALE : PME : PLE = 12 : 9 : 13.5 : 10.5. AME separated from one another by seven-fourths of their diameter, from ALE by slightly more than two and one-half times their diameter. PME separated from one another by a little less than one and one-half times their diameter, from PLE by a little less than three and three-fourths times their diameter. Laterals separated from one another by two-thirds of the diameter of PLE. Height of clypeus equal to the diameter of AME.

*Chelicerae.* Basal segment 1.105 mm. long; fang groove well defined and with the usual complement of teeth on both margins; other observed features typical of the genus.

*Maxillae.* Appear to be completely typical of the genus in all observed features.

*Lip.* Wider than long in ratio of about 23 : 19; gently grooved and cross striated in proximal third. Sternal suture definitely procurved; with marked anterolateral sternal tubercles at lateral ends of suture.

*Sternum.* Scutiform; longer than wide in ratio of 29 : 25; with a bluntly bifurcated posterior end which is not continued between fourth coxae which are separated by about one-quarter of their width; only moderately convex opposite the coxae; with a moderately well developed supply of long and short bristles and with a row of six spinules between first coxae.

*Legs.* 1243. Width of first patella at "knee" .4657 mm., tibial index of first leg 10. Width of fourth patella at "knee" .4332 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.510	1.495	3.022	2.665	1.170	11.862
2.	3.315	1.495	2.567	2.600	1.040	11.017
3.	2.275	.925	1.170	1.300	.780	6.450
4.	2.990	1.365	2.015	2.210	.910	9.490

*Spines.* First leg: femur dorsal 0-0-1-0-1, on right and 0-0-0-0-1 on left, prolateral 0-0-1-1-1 on right and 0-1-1-1-1 on left, retrolateral 0-0-0-1-1, ventral only one on promargin and retromargin near distal end; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1; tibia dorsal 0-1-1-1-0, prolateral 0-1-1-0-0-1-1-1 on left and 0-1-0-1-1 on right, ventral 2-lp-lp-0-2; metatarsus dorsal 0-1-1-0-0, prolateral 0, retrolateral 0-1-0-0, ventral 2-2-2-0. Second leg: femur dorsal 0-0-1-1-1 on right and 0-0-1-0-1 on left, prolateral 0-0-1-1-1, retrolateral 0-0-0-1-1 on right and only one near distal end on left, ventral 0; patella essentially as in first; tibia dorsal as in first, prolateral and retrolateral 0-1-0-1-1, ventral 2-lp-lp-lr; metatarsus dorsal 0-1-1-0, prolateral 0-1-1-0, retrolateral 0-1-0-1-0, ventral 2-2-lp-0. Third leg: femur dorsal 0-1-1-1, prolateral and retrolateral only one near distal end, ventral 0; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0; tibia dorsal 1-0-1-0, prolateral 0-1-0, retrolateral 0-0-1, ventral lp-lp-2; metatarsus dorsal 0-1-0, prolateral 0-1-1, retrolateral 0, ventral lp-0-1-1. Fourth leg: femur essentially as in third except ventral one on retromargin near distal end; patella as in third except retrolateral 0-0-1; tibia dorsal 0-1-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-0, ventral lp-lp-2; metatarsus dorsal 1-1-0, prolateral 0-1-0-1-1, retrolateral 0-1-1-0, ventral 0-lp-lp-lp.

*Abdomen.* 4.03 mm. long; 3.51 mm. wide between possible suppressed shoulder humps nearly one-third of length from base; with the usual round-triangular form; also with just the suggestion of a dorsoventral bifid condition similar to that found in *E. bifida*; other observed features appear to be normal to the genus.

*Epigynum.* The scape is very long as compared to the width of the base; the central part of the base is very prominent; the apertures are very close together; the internal tubules appear to present a rather characteristic pattern (Figs. 124-126).

*Color in alcohol.* The carapace is generally yellowish; the

pars cephalica has a central darker patch behind the PME and a pair of similar dorsal patches at the base of this region; there is also an irregular whitish spot halfway between PME and the thoracic groove made by an accumulation of white subchitinous granules. The legs are, as usual, yellowish with brown rings and spots. Abdomen: isolated parts of the dorsal folium remain in the holotype but the dorsum and lateral sides are largely yellowish-white from an accumulation of subchitinous granules; the venter has a large brownish, somewhat quadrilateral area, between the genital groove and the base of the spinnerets containing a rounded central white spot. In some paratypes the carapace has a large irregular brownish spot on the pars cephalica, a well developed dorsal folium on the abdomen and an elongated white spot in the center of the dark area on the venter.

*Type locality.* The holotype is from Barro Colorado Island, C. Z., July, 1939. Several paratype females have been taken in the same locality as follows: June, 1924 (Banks); June, 1934; June-July, 1936; July-August, 1939; March, 1946 (Schneirla); July-August, 1950.

### EUSTALA SEMIFOLIATA (O. P. Cambridge)

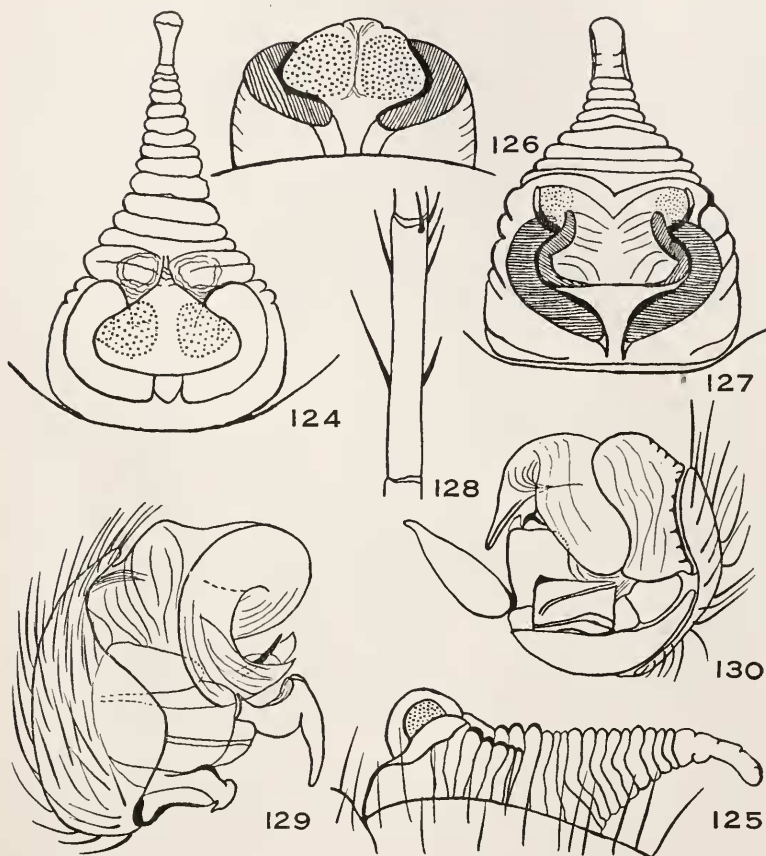
(Figure 127)

*Epeira semifoliata* O. P. Cambridge, 1899

*Eustala semifoliata* F. P. Cambridge, 1904

*Eustala semifoliata* Petrunkevitch, 1911

*Female hypotype.* Total length 11.7 mm. There are several distinctive features not sufficiently emphasized in the original or later descriptions. The cephalic part of the carapace is prominently raised; the ME are raised up on a strongly developed ocular cone; the carapace has a heavy coat of white hairs; there is a pair of well developed abdominal shoulder humps; the leg spines are more robust than ordinarily found in females. The ME of the hypotype are defective and, hence, the data on eyes are taken from another specimen. The central ocular quadrangle is wider in front than behind in ratio of 8 : 7, only slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 9 : 6.5 : 8 : 6.5. AME separated from one another by about one and one-half times their diameter, from ALE by four times their

External Anatomy of *Eustala*Figures 124-126, *E. sedula*Figure 127, *E. semifoliata*Figures 128-130, *E. tantula*

- Fig. 124. Epigynum from below.  
 Fig. 125. Epigynum, lateral view.  
 Fig. 126. Epigynum, a posterior view.  
 Fig. 127. Epigynum from below.  
 Fig. 128. Left second tibia from below.  
 Fig. 129. Male palpal tarsus, lateral view.  
 Fig. 130. Male palpal tarsus from distal end.

diameter. PME separated from one another by about one and one-half times their diameter, from PLE by about five and one-half times their diameter. Laterals separated from one another by slightly more than their radius. Height of the clypeus equal to two and two-thirds of the diameter of AME. Promargin of the fang groove with four teeth, the fourth the smallest; retro-margin with three teeth, all nearly equal in size and fairly robust.

*Legs.* 1243. Width of first patella at "knee" .7906 mm., tibial index of first leg 12. Width of fourth patella at "knee" .8123 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	5.525	2.470	4.160	4.420	1.625	18.200
2.	5.460	2.340	4.062	4.420	1.625	17.907
3.	3.575	1.430	2.080	2.275	1.235	10.595
4.	5.785	2.405	3.705	4.030	1.430	17.355

Ventral spines on femora as follows: first femur with three on promargin and apparently only one on retromargin near distal end; second femur only one on promargin near distal end; third femur apparently none; fourth femur with one on each margin near distal end.

*Epigynum* (Fig. 127). With a more or less distinctive pattern of tubules, apertures, and striations; best shown in a figure. The base has not been seen inflated but it probably exists as in *E. bifida*.

*Color in alcohol.* The general coloring of the two specimens available for study together with the single specimen from the British Museum is quite variable as usual in the genus. Certain features, however, appear to be quite reliable as aids to identification. These are: a pair of dark dots in front of the median thoracic groove; six dark dots in a somewhat procurved transverse row across the anterior end of the thoracic groove; a partial ring of white spots more or less surrounding the bases of the spinnerets; a pair of white spots transversely placed in a black area between the genital groove and base of spinnerets; the whitish sternum is bordered with brown.

*Type locality.* The female hypotype and another female specimen are from Barro Colorado Island, C. Z., August, 1939 and June, 1936, respectively.



## EUSTALA TANTULA sp. nov.

(Figures 128-130)

*Male holotype.* Total length 3.315 mm. Carapace 1.755 mm. long; 1.43 mm. wide opposite intervals between second and third coxae where it is widest; .615 mm. tall and, therefore, about .43 as tall as wide; only gently raised from PME to beginning of steep posterior declivity which passes abruptly to the posterior margin; with a fairly well defined median longitudinal thoracic groove; with two pairs of spinules at anterior end of thoracic groove; with numerous slender spines and spinules in ocular area.

*Eyes.* Eight in two rows, all dark; LE on moderately prominent tubercles; viewed from above, posterior row moderately recurved; viewed from in front, anterior row straight or slightly procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 18 : 13, wider in front than long in ratio of 12 : 11. Ratio of eyes AME : ALE : PME : PLE = 12 : 8.5 : 9 : 8. AME separated from one another by slightly more than their diameter, from ALE by about two-thirds of their diameter. PME separated from one another by seven-ninths of their diameter, from PLE by about two and one-half times their diameter. Laterals separated from one another by slightly less than the radius of ALE. Height of clypeus equal to the diameter of AME.

*Chelicerae.* Essentially parallel; with moderately well developed basal boss; basal segment .574 mm. long. Fang groove well defined; promargin with four teeth, retromargin with three small teeth (recorded from a paratype to avoid injury to holotype).

*Maxillae.* Parallel; convex along retrolateral surface; with a strongly developed serrula; maxillary tooth as usual to oppose ridge on palpal femur.

*Lip.* Wider than long in ratio of 13 : 9; moderately pointed at distal end; reaches only about two-fifths of the length of the maxillae. Sternal suture gently procurved.

*Sternum.* Scutiform; as wide as long; a sclerite continues between fourth coxae which are separated by a little more than two-fifths of their width; with numerous long slender spinules

of which the largest eight make a transverse row across the anterior fourth.

*Legs.* 1243. Width of first patella at "knee" .2383 mm., tibial index of first leg 7. Width of fourth patella at "knee" .2058 mm., tibial index of fourth leg 11.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	2.860	.780	2.535	2.156	.836	9.167
2.	1.950	.572	1.625	1.694	.660	6.501
3.	1.202	.462	.704	.792	.440	3.600
4.	2.015	.585	1.267	1.592	.650	6.109
Palp	.396	.184	.130	—	.594	1.304

First coxa with the usual distal retrolateral ventral hook; dorsal tubercle on first coxa poorly developed. The prolateral groove and ridge on second femur well developed.

*Spines.* First leg: femur dorsal and prolateral 0-1-1-0-1-1, retrolateral 0-0-0-1-1; ventral 0-2-2-0-2; patella dorsal 1(weak)-1, prolateral 0-1-0, retrolateral 0-0-1; tibia dorsal 0-1-0-1-0-1-0, prolateral 0-1-0-1-0, retrolateral 0-0-1-0-1-0, ventral 2-0-2(irregular)-0-lr; metatarsus dorsal 0-1-0-1-0-0 prolateral 0, retrolateral 0-1-0-1-0, ventral 0-2-0-0. Second leg: femur dorsal 0-1-1-1-0-1, prolateral apparently 0, retrolateral only one near distal end, ventral three or four along retromargin; patella as in first; tibia dorsal and prolateral as in first, retrolateral 0-1-0-1-1-1, ventral 0-0-lr (Fig. 128); metatarsus appears to be nearly as in first. Third leg: femur dorsal 1-0-1, prolateral and retrolateral only one near distal end, ventral 1-1-0-0-0; patella only dorsal 0-1; tibia dorsal 1-0-1-0, prolateral 0, retrolateral 0-0-1, ventral 0-lp-2; metatarsus dorsal 0-1-0-0, prolateral and retrolateral 0-1-0-0, ventral 0-1-1. Fourth leg: femur dorsal 0-1-0-1, prolateral and retrolateral only one near distal end, ventral 0; patella as in first; tibia dorsal 0-1-0-0-1-0, prolateral 0-1-0-1-0, retrolateral 0-1-1-1-1, ventral 2-0-lp-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-1-0, retrolateral 0-1-0-1, ventral 0. Considerable variation of spination has been noted among paratypes and even from left to right in the holotype.

*Palp.* Complicated; basal femoral tubercle or ridge moderately well developed; patella and tibia short and essentially typical of the genus; the patella has a weak proximal and a long slender

distal spine on the dorsal side as usual. Tarsus: basal tarsal apophysis geniculate near its distal end where the arrow-head is slender; the clavis is moderately robust, deeply excavate at its base where it is broad and strongly geniculate; the uncus is a long slender and somewhat flattened spine; the conductor, largely hidden in ventral view, has a thin transverse process more or less parallel to the uncus and a broad, relatively massive base which is sparsely setose only along a part of its medial border; the massive base of the conductor is only seen well in distal view; the vesicle is very prominent and spirally twisted in a very striking manner; the embolus is apparently hidden by the over-developed vesicle; the terminal laminae have a distinctive pattern the most prominent feature of which is the relatively large quadrilateral body contiguous to the conductor (Figs. 129-130).

*Abdomen.* Total length 1.852 mm.; longer than wide in ratio of 4 : 3; with numerous long slender dorsal and dorsolateral spinules; other features as usual in the genus.

*Color in alcohol.* Carapace yellowish with faintly outlined dark dots along base of pars cephalica and a single large dark spot on each side of lateral part of pars cephalica and passing dorsally behind PME. The legs are yellowish with numerous dark spots and rings. The sternum is yellowish with dusky flecks concentrated into dark spots opposite all coxae except the fourth. Abdomen: there is a poorly outlined grayish dorsal folium; on the venter between the genital groove and base of spinnerets there is a light spot containing a dark colored cross the central part of which extends to a narrow dark bar which is a part of a broken ring around the spinnerets and anal tubercle. As usual, no great reliance can be placed upon the color pattern as an aid to identification of the species. The paratypes show many variations in color.

*Type locality.* The holotype is from Barro Colorado Island, C. Z., August, 1939. Sixteen paratype males have been found from the following localities: Barro Colorado Island, C. Z., July, 1936; Ft. Davis, C. Z., July, 1936; Canal Zone Forest Reserve, C. Z., July and August, 1939; Ft. Sherman, C. Z., August, 1939; Madden Dam Forest, C. Z., August, 1939; near Chiva, C. Z., August, 1950; El Valle, R. P., July, 1936; Boquete, R. P., July, 1939.

EUSTALA TUMIDA sp. nov.  
(Figures 131-132)

*Female holotype.* Total length 6.045 mm. Carapace 2.73 mm. long, 2.145 mm. wide opposite second coxae where it is widest; 1.04 mm. tall in cephalic region where it is tallest and, therefore, about .48 as tall as wide; with median longitudinal thoracic groove well defined and with a pair of short black spines at its anterior end and another pair of short, light colored spines a little further forward; with a moderately well developed coat of whitish procumbent hair; pars cephalica drawn out into a conspicuous cone upon which both pairs of median eyes are placed in a very distinctive position (Fig. 131).

*Eyes.* Eight, probably to be considered as being placed in two rows in spite of their unusual position on the cephalic cone, all dark. Viewed from above, posterior row rather strongly recurved; viewed from in front, anterior row strongly procurved. Central ocular quadrangle wider behind than in front in ratio of 39 : 37, wider behind than long in ratio of 39 : 36. Ratio of eyes AME : ALE : PME : PLE = 10 : 8 : 11.5 : 7. AME separated from one another by nearly two diameters, from ALE by 3.7 of their diameter. PME separated from one another by about 1.5 times their diameter, from PLE by about 5.5 times their diameter. Laterals separated from one another by three-fourths of the diameter of ALE. Height of clypeus equal to a little less than four times the diameter of AME.

*Chelicerae.* Basal segment .88 mm. long. Fang groove as usual with four teeth along promargin and three along retromargin. Other observed features typical of the genus.

*Maxillae.* Appear to be typical of the genus in all observed features.

*Lip.* Wider than long in ratio of about 5 : 3; reaches somewhat beyond middle of the maxillae. Sternal suture gently procurved.

*Sternum.* Scutiform; longer than wide in ratio of about 5 : 4; continued from posterior end by a narrow dark line between fourth coxae which are separated by nearly one-fourth of their width; with low convexities at posterior end and opposite first to third coxae and with a small tuft of bristles and spinules at each convexity; also with a transverse row of long slender spinules between first coxae.

*Legs.* 1243. Width of first patella at "knee" .3791 mm., tibial index of first leg 9. Width of fourth patella at "knee" .3791 mm., tibial index of fourth leg 12.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.185	1.300	2.957	2.665	1.105	11.212
2.	2.925	1.202	2.502	2.502	.975	10.106
3.	1.787	.682	1.040	.975	.650	5.134
4.	2.665	1.250	1.885	2.177	.877	8.854

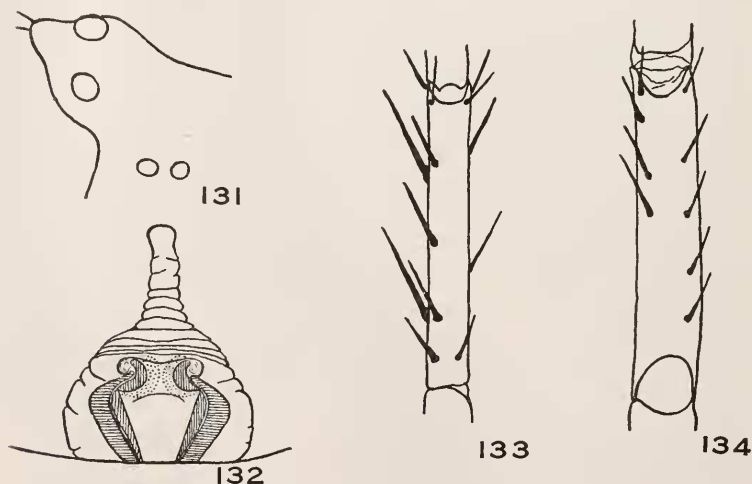
*Spines.* First leg: femur dorsal 0-1-0-1(weak), prolateral 0-1-1-0-1, retrolateral apparently only one near distal end, ventral 0; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0-0-1; tibia dorsal 0-1-1-1-0, prolateral 0-1(weak)-1-1-0, retrolateral the same, ventral 2(irreg.)-lp-0-2; metatarsus dorsal 0-1-1-0-0, prolateral 0-1-0-0, retrolateral 0-1-1-0, ventral 2-2-2-0. Second leg: femur dorsal as in first, prolateral and retrolateral 0-0-0-1-1, ventral 0; patella dorsal and retrolateral as in first, prolateral 0-1-1; tibia dorsal as in first, prolateral 1-1-0-0-1, retrolateral 0-1-1-0, ventral lp-lr-0-lr; metatarsus dorsal and retrolateral as in first, prolateral 0-1-1-0, ventral lr-lr-0-0. Third leg: femur dorsal, prolateral, and retrolateral apparently with only one near distal end in each instance, ventral 0; patella dorsal 1-1, prolateral 0-1-0, retrolateral 0-0-1; tibia dorsal 1-0-0, prolateral and retrolateral 0, ventral 1-1-0-lr; metatarsus dorsal 0-1-0-0-0, prolateral 0, retrolateral 0-1-0, ventral 1-0-1 and many spinules. Fourth leg: femur apparently only one dorsal and one ventral on retromargin both at distal end but a row of retromarginal spinules suggest spines; patella essentially as in third; tibia dorsal 0-1(weak)-0-0-1-0, prolateral 1-1-0-1-1?, retrolateral 1-1-1(weak), ventral lp-0-2; metatarsus dorsal 0-1-0, prolateral 0-1-1-0, retrolateral 0-1-1-0, ventral 0.

*Abdomen.* 3.445 mm. long; 2.405 mm. wide about one-fourth from base where is is widest; with a series of five pairs of low dorsolateral tubercles; there is also a low median tubercle about one-fourth from posterior end and another beneath this one and just dorsal to the anal tubercle; the abdomen extends posterior to the spinnerets about one-fourth of its total length; apparently without the long dorsal and dorsolateral abdominal spines so common in the genus but a type of short spines occurs in the

same regions; other observed features appear to be typical of the genus.

*Epigynum.* This organ illustrates well the difficulties involved in recording the specific epigynal features in the numerous species of *Eustala* and in making these distinctions clear to other workers. Here the apertures are about two diameters apart; the central part of the base exhibits a characteristic shape best shown by a figure; the scape is of moderate length and springs quite abruptly from the base (Fig. 132). The base in the holotype is not sufficiently extended to make practicable a drawing from a lateral aspect.

*Color in alcohol.* Carapace: yellowish with small irregular reddish brown spots over the dorsal part; in the region of the clypeus there are irregular small gray spots; at the base of the pars cephalica there is a white triangular subchitinous spot with



External Anatomy of *Eustala*

Figures 131-132, *E. tumida*

Figures 133-134, *E. vegeta*

- Fig. 131. Cephalic cone, lateral view.  
Fig. 132. Epigynum from below.  
Fig. 133. Left second tibia from below.  
Fig. 134. Right fourth femur from below.



its apex directed posteriorly. The sternum is nearly white with irregular chalk-white subchitinous marginal spots. The legs are yellowish with grayish spots, rings, and bars. Abdomen: the dorsal folium is poorly outlined by remnants only; the whole dorsal and dorsolateral areas are largely white from a multitude of white subchitinous granules but there are numerous reddish dots and streaks as well as many black dots and streaks; on the venter there is an irregular white spot, composed of many subchitinous granules, just in front of the spinnerets and another similar spot between that and the genital groove and on each side of the latter there is a large irregular elongated dark gray spot.

*Type locality.* The holotype is from Summit, C. Z., August, 1950.

### EUSTALA VEGETA (Keyserling)

(Figures 133-138)

*Epeira vegeta* Keyserling, 1865

*E. vegeta* Keyserling, 1892

*Acacesia vegeta* Simon, 1895

*Eustala vegeta* F. P. Cambridge, 1904

*E. vegeta* Petrunkevitch, 1911

In defining the species, F. P. Cambridge emphasized the following features of the male palp: the uncus is without the strong transverse enlargement at the base characteristic of *E. bifida*; it does not have the enlarged shoulder on the inner margin of the uncus as in *E. guttata*; the embolus is shorter than in *E. scutigera*; the conductor is not sharply angled as in *E. scutigera*. F. P. Cambridge also stressed the following features in the epigynum: the scape is "abruptly narrowed at its apex" but it is broad and transversely wrinkled at the base; the apertures, "marked by circular black spots" are two to three diameters apart. In view of the large number of species and the difficulty of separating those which are closely related these vague and very general definitions leave us with much uncertainty. The study of specimens on loan from the British Museum has greatly helped in clarifying the distinctions between this and related species so that I feel fairly confident of the facts as stated below.

*Male hypotype.* Total length 4.452 mm. With the typical form of the body. Central ocular quadrangle wider in front than behind in ratio of 35 : 26, wider in front than long in ratio of 35 : 32. Ratio of eyes AME : ALE : PME : PLE = 11 : 8 : 9 : 8. AME separated from one another by nearly 1.5 times their diameter, from ALE by the same distance. PME separated from one another by about five-fourths of their diameter, from PLE by slightly more than three times their diameter. Lateral eyes separated from one another by their radius. Height of clypeus equal to the diameter of AME. Secondary sexual characters on first coxae, maxillae, and second femora typical of the genus.

*Legs.* 1243. Width of first patella at "knee" .3249 mm., tibial index of first leg 9. Width of fourth patella at "knee" .2708 mm., tibial index of fourth leg 10.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.120	1.072	2.567	2.372	1.040	10.171
2.	2.470	.965	1.755	2.015	.942	8.147
3.	1.495	.585	.910	.900	.565	4.455
4.	2.210	.910	1.690	1.852	.812	7.474
Palp	.430	.264	.154	—	.880	1.728

The first femur appears to have only two ventral spines, one on each margin near distal end; the second femur has three ventral spines along the retromargin and one near distal end on the promargin; the third femur appears to have three ventral spines along the promargin and none on the retromargin; the right fourth femur has five along the promargin and four along the retromargin (Fig. 134), while the left femur has fewer. The second tibia has special spines as shown in Figure 133.

*Palp.* Maxillary tooth, femoral ridge, and patellae typical of the genus; the dorsal lobe of the tibia is somewhat longer than in most species. Tarsus: the basal tarsal apophysis is a typical arrow head with only slight distortion except the usual bend in the shank; the clavis is moderately robust and has a shallow basal ventral concavity which is very setose; the uncus is a distinct hook with its curvature toward the tip of the embolus as shown in F. P. Cambridge's Figure 16; the conductor is fairly large, has no lobe such as that found in the palp of *E. scutigera* but has a depression within which the uncus lies and

it also has a deep dorsolateral concavity; the embolus is of moderate length, slender, gently curved; the terminal laminae are raised into a high prominence contiguous to the conductor and have a prominent tubercle dorsal to the prominence (Figs. 135-136).

*Female hypotype.* Total length 7.02 mm. Body form like that of male.

*Legs.* 1243. Width of first patella at "knee" .4007 mm., tibial index of first leg 11. Width of fourth patella at "knee" .3574 mm., tibial index of fourth leg 13.

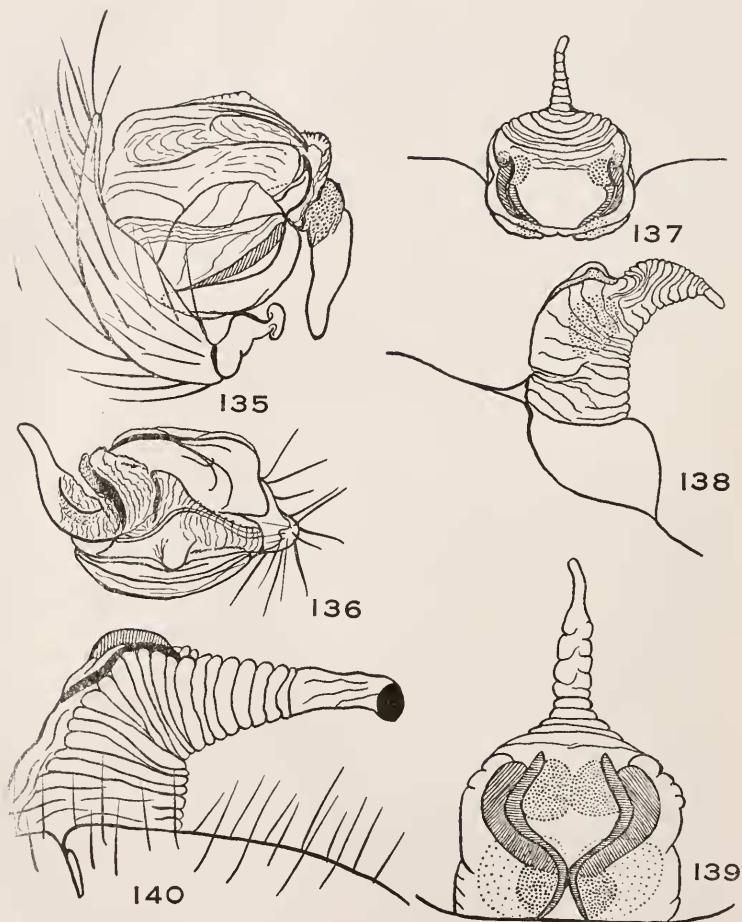
	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	3.120	1.170	2.535	2.210	1.105	10.140
2.	2.730	1.170	2.112	1.950	1.040	9.002
3.	1.690	.747	.910	1.007	.715	5.069
4.	2.632	1.040	1.625	1.885	.910	8.092

First femur with a single ventral spine on both margins but apparently none of the other femora has ventral spines.

*Epigynum* (Figs. 137-138). Much like that of *E. scutigera*; the scape is relatively longer and it arises more abruptly than in that species; both apertures and spermathecae are much farther apart than in *E. scutigera*.

*Color in alcohol.* The color is much the same as in *E. scutigera*. The two rows of dots on the carapace show well in the male but are faint in the female; this color feature appears to be less consistent than in several other species. In both hypotypes the sternum is yellowish with a fairly broad brownish margin. The legs have the common yellowish color with many brownish dots, bars, and rings; in the male hypotype the femora are nearly all brown except the yellowish proximal third. The dorsal folium is clear and definite on the abdomen of the male and less well outlined in the female. In both the venter has a dark and more or less quadrilateral area between the genital groove and the base of the spinnerets containing the usual white spot, small and rounded in the male but larger and elongated in the female.

*Collection records.* The male hypotype is from Tlacotalpan, Veracruz, Mexico, July, 1946 (H. Wagner); the female hypotype is from Vera Cruz, La Planta Moctezuma, near Fortin, Mexico, July, 1947 (C. and M. Goodnight). Other females are



External Anatomy of *Eustala*

Figures 135-138, *E. vegeta*

Figures 139-140, *E. venusta*

Fig. 135. Male palpal tarsus, lateral view.

Fig. 136. Male palpal tarsus, distal view.

Fig. 137. Epigynum from below.

Fig. 138. Epigynum, lateral view.

Fig. 139. Epigynum from below.

Fig. 140. Epigynum, lateral view.

from the same localities as those from which the hypotypes were taken, and other parts of Mexico as follows: Cordova, Jalapa, Veragua, 1946 (J. C. and D. L. Pallister); Tlapocayan, Veragua, July, 1946 (H. Wagner); Mantla, Veragua, July, 1946 (H. Wagner). Males are in my collection from: Costa Rica, Santa Maria (Tristan), no date; Porto Bello, R. P., August, 1936.

EUSTALA VENUSTA sp. nov.

(Figures 139-140)

*Female holotype.* With the conventional round-triangular form. Total length 7.67 mm. Carapace 3.25 mm. long; 2.697 mm. wide opposite interval between second and third coxae where it is widest; 1.365 mm. tall and, therefore, about .5 as tall as wide; median thoracic groove deep and well defined; with numerous short spinules and a fairly well developed coat of whitish procumbent hair over most of the surface.

*Eyes.* Eight in two rows, all dark; viewed from above, posterior row strongly recurved; viewed from in front, anterior row gently procurved, measured by centers; central ocular quadrangle wider in front than behind in ratio of 37 : 34, only slightly wider in front than long. Ratio of eyes AME : ALE : PME : PLE = 10 : 8.5 : 11 : 9. AME separated from one another by slightly more than twice their diameter, from ALE by four times their diameter. PME separated from one another by nearly one and one-fourth times their diameter, from PLE by nearly 4.6 times their diameter. Laterals separated from one another by two-thirds the diameter of PLE. Height of clypeus equal to  $6/5$  of the diameter of AME.

*Chelicerae.* Basal segment 1.3 mm. long; general features as usual in the genus. Fang groove finely dentate; promargin with four teeth, as usual with second and fourth smaller; retromargin with three teeth.

*Maxillae.* Appear to be completely typical of the genus in all observed features.

*Lip.* Wider than long in ratio of 4 : 3; reaches to about the middle of the maxillae. Sternal suture distinctly procurved with anterolateral corners of the sternum distinctly tuberculous.

*Sternum.* Scutiform; longer than wide in ratio of 62 : 55;

truncated at posterior end which is not continued between fourth coxae which are separated from one another by about one-sixth of their width; deeply scalloped marginally opposite all coxae except the first; only moderately convex opposite first to third coxae; well supplied with stiff spinules.

*Legs.* 1243. Width of first patella at "knee" .5307 mm., tibial index of first leg 9. Width of fourth patella at "knee" .5198 mm., tibial index of fourth leg 13.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.875	1.722	3.900	3.185	1.235	14.917
2.	4.160	1.560	3.120	2.827	1.170	12.837
3.	2.405	.858	1.210	1.232	.758	6.463
4.	3.835	1.560	2.405	2.550	.975	11.325

*Spines.* First leg: femur dorsal 0-0-1-0-1-1, prolateral 0-0-1-1-1-1, retrolateral 0-0-0-1-1-1, ventral 0; patella dorsal 1(weak)-1, prolateral and retrolateral 0-1-1-0; tibia dorsal 0-1-1-1-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-lr-lp-lr-lp-lp-2; metatarsus dorsal and prolateral 0-1-0-1-0-0, retrolateral 0-1-0-1-0, ventral 2-2-0-lp. Second leg: femur dorsal, retrolateral, and ventral as in first, prolateral 0-0-1-1-1; patella as in first; tibia dorsal as in first, prolateral and retrolateral 0-1-0-1-1, ventral 2-2-2-2; metatarsus dorsal 0-1-0-1-0-0, prolateral and retrolateral 0-1-0-1-0, ventral 2-lr-0-lp. Third leg: femur dorsal 0-1-1-1, prolateral and retrolateral 0-0-0-1-1, ventral 0; patella dorsal 1-1, prolateral and retrolateral 0-1-0; tibia dorsal 1-0-1, prolateral 0-1-0-1, retrolateral 0-0-1, ventral lp-lp-2; metatarsus dorsal 0-1-0-0, prolateral 0-1-1, retrolateral 0-1-0, ventral lp-lp-1-1. Fourth leg: femur dorsal 0-1-0-1-1, prolateral 0-0-0-1-1, retrolateral only one near distal end, ventral 0; patella as in third; tibia dorsal 1-0-1-1-0, prolateral 1-1-1-1, retrolateral 0-1-1, ventral lp-lp-lp-2; metatarsus dorsal 0-1-0-1-0-0, prolateral 0-1-1-1, retrolateral 0, ventral lp-lp-lp-lp. Palp: femur with dorsal spines 0-1-1; patella with dorsal spines 1-1, prolateral 1-0; tibia with dorsal spines 0-1-0, prolateral 1-1, retrolateral 0-1; tarsus with many spines and spinules irregularly distributed. Palpal claw pectinate in a single row of nine or ten slender teeth.

*Abdomen.* 5.135 mm. long; widest about one-fifth from base where convexities suggest suppressed shoulder humps. Other observed features are typical of the genus.



*Epigynum.* Base with nearly the usual conventional forms of tubules, striations, apertures; spermathecae large and clearly defined; scape relatively long and arises from base abruptly, and slender throughout as shown by lateral views (Figs. 139-140).

*Color in alcohol.* Carapace yellowish with faint darker striations contiguous to cephalic groove; there is a brownish dot on each side of median thoracic groove opposite its middle and another faint dot on each side in front of the groove. Sternum yellowish with a broad broken brownish margin. Legs: yellowish with many brown bands. Abdomen: the dorsal folium is fairly well outlined in the holotype but is highly variable in the paratypes; the venter has a large brown quadrilateral area between the genital groove and the base of the spinnerets containing an elongated white spot which seems to be quite persistent among the paratypes.

*Type locality.* The female holotype is from Barro Colorado Island, C. Z., July, 1950. About 25 female paratypes from the following localities have been studied: Barro Colorado Island, C. Z., June-July, 1934; July-August, 1936; July-August, 1939; June-August, 1950. Canal Zone Forest Reserve, C. Z., August, 1939. Near Chiva, C. Z., July, 1950. Summit, C. Z., July-August, 1950.

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